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—BY—

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THE movement for securing a Government Commission to carry on exhaustive tests as to the conditions of strength and security in iron and steel structures, so that these qualities may be more certainly obtained, is gradually gaining strength. One result would be greater economy of material. As Professor Thomas Eggleston remarked in a paper read before the American Society of Mechanical Engineers: Many of our structures are undoubtedly too heavy, and are fatigued by their own weight, and would be stronger if a large amount of the material were removed from them. If we could save 3 per cent of the weight of the structures, and still have them strong enough to do the work which they are called upon to do, we should save 6,000 tons of rolled iron, or 21,000 tons of the total amount of iron, steel, and cast iron produced. It is more than probable that the saving would be much larger than this, and yet this of itself would many times repay the expense of a commission. We are using steam boilers, and yet we do not know much about the metal which is essential for their construction. A few corporations have ascertained that there are many points of weakness in the irons usually used for boiler plates, which can easily be avoided, and yet until within a comparatively short time, it was not possible for the boiler makers to make specifications which would be sufficiently specific to cause an iron to be made which should be light and at the same time perfectly safe. Manufacturers may indeed undertake the work of testing structural materials, but the result of their investigations are their private property which they cannot be expected to communicate.

The United States is the largest single consumer of constructive materials; next come the railways, and while the United States, though most directly interested, is doing little or nothing, only a single railway corporation is making investigations for itself, which makes it what it is now, probably the best managed and the greatest railway that the world knows. What should be done is to build structures and test them. Let us put up a bridge, a truss, a roof and columns, put in, load, and break them, reinforce, reload, and break again. Under such conditions it is questionable whether our present forms and shapes would continue in use, and whether different qualities of metal would not be demanded for the consumers' advantage. If, as the results of the commission, we could increase the profitable use or cut down the weight of constructive materials 5 per cent, the United States would gain every year over $100,000 in each of its navy yards. The old commission have settled once for all that the testing on a diminished area gave false results. What we know of testing on full sizes is the work of this commission, and that is extremely meagre. It is one thing to know what the individual member of a composite structure will resist, and quite another thing to know what it will do in combination with others. It is one thing to know what strain these composite members of a bridge will bear, and when fatigued what they will support under loads of certain kindt; it is quite another thing to know how the strain will act on all the composite parts put together. What we know about this subject has been learned mainly from disaster, and these disasters do not teach us what a test commission would, for the reason that disaster is always unforseen, and there is no time to study anything but after effects.

MR. ADDISON BURK, who recently read a paper before the Social Science Association of Philadelphia, on "Apprenticeship as It Was and Is," instituted an inquiry to discover whether the conditions under which the apprenticeship system was established in this country still survived, and to what extent in towns, villages, &c. He states that although there are very few indentured apprentices in Philadelphia, such large cities as Wilmington still maintain the old system in some of the trades, and in smaller towns and villages the relations of the old-time apprentice and his master are almost exactly reproduced. Taking hold of the census returns which show that of the 3,750,000 persons engaged in manufacturing and mechanical industries in the United States, only 1,000,000 reside in cities containing over 20,000 of population, the remaining 2,750,000 residing in the smaller towns and villages, Mr. Burk asserts, apparently without due warranty, that while the apprenticeship system is almost obsolete in the larger cities, it still exists among the great majority of mechanical workers. It also appears, he states, that the workshops of large cities are extensively supplied with skilled workmen from the smaller country towns. In the cities there are also many learners of trades, though they are not bound for a term of years. Various plans for holding them until they have learned their trades have been tried, these generally taking the form of holding out a premium to be earned by those only who complete their trade. We would be glad to learn that any efficient apprenticeship system was so widely diffused, but our own observations do not confirm Mr. Burk's views. We must presume he takes the word apprenticeship in its loosest sense, the mere engagement of youths in workshops for a longer or shorter period without an absolutely binding engagement, and without due provision for a thorough training in all branches of the industries with which they connect themselves. In a number of our leading cities, including Cleveland, a system of modified apprenticeship of this latter character, has been introduced in several leading establishments and is found to work well, promising good results. In not a few provision is even made for technical training. The general prevailing want is that of night schools in our cities which shall provide instruction in mechanical drawing. The results that have attended such a school in Worcester, Mass., should stimulate manufacturers elsewhere to set them up. There is no fear of young men engaged in mechanical pursuits not taking advantage of them. We quote the following from the last annual report of the Worcester school:

"The list of complete drawings numbered 600, and about 500 of these were on exhibition. The advanced classes in architecture and machinery, number 70 pupils in equal divisions, a gain of 25 over the attendance last year. In this department 450 complete and finished drawings have been made, and over 300 were on exhibition. The majority exhibited are very creditable, and all presented a neat and cleanly appearance, with, in some instances, a remarkable good order of talent. The work of the elementary class begins with problems and ground drawings and their application, leading up afterwards to simple projections with problems in the intersection of surfaces and inclined projections of conic and other forms. A number of the scholars in this class have completed several full and finished drawings with details, the work consisting principally of the proper construction of gear wheels and cams. The elementary class alone numbered 60 pupils, the full number in attendance in both classes last year, and the advanced class numbered 45 pupils at the beginning of the term."

Thorough instruction in the principles of mechanics is what is wanted, such as will afford an intelligent understanding of mechanical operations and provide the groundwork for steady advance.

WE have received from the Department of State additional reports from U. S. Consuls relative to the commerce, manufactures, &c., of their consular districts. Consul Prince of Belleville, Canada, states:

In conversation with dealers in various kinds of merchandise, I find the most of them kindly disposed to the manufactures of the United States, aithough they complain greatly of the Canadian tariff as a great drawback to their more general sale. Notwithstanding this, all dealers are obliged by the demand to keep some, and I am convinced from my own observation, and from information derived from personal interviews with dealers themselves in many cases, that more American goods could be sold in Canada, were the aggressive policy pursued, i. e., sending commercial travelers direct to the dealer from United States houses and manufacturers. The dealers in this section mainly depend on the large wholesale houses in Montreal, Toronto, or Hamilton for their supplies, and the competition between them is so sharp, that the road is thronged by their travelers, and as a consequence only their particular styles get before the country dealer, who is the medium through which they reach the consumer. But were the samples of American goods brought direct to the notice of these merchats throughout the country, by commercial travelers for United States houses, I am confident the sales of American goods could be largely increased, and a healthy permanent demand created.

He adds that the mineral regions of Canada are the subject of much attention to American capitalists. Turning to remote Singapore, we find a commencement made for the introduction of America furniture, which, to suit the country, must be entirely made of hardwood. Singapore is one of the countries where our tinware, stamped goods and cooking utensils can find no sale, the climate being too hot for iron cooking stoves and ranges. American canned goods, vegetables and meats can be disposed of at good prices. Our Consul remarks:

"The sale of edge tools, notwithstanding the fact that Singapore is in the center of one of the heaviest timbered regions in the world, is almost null and void; this in a great measure, is owing to the absence of an able and practical American agency for the introduction and sale of the same. Another good reason is that the mechanics here using edge tools are very nearly all Chinamen, who bring their tools with them from China, or buy them here from their own countrymen. The Chinese are used to those tools and they are always of excellent temper, answering well among the hardest known wood here. It may be known to some, but not generally in our country, that the Eastern races understand how to harden or temper steel for edge tools and weapons in a manner superior to any other peoples or races. I have myself seen the edges of "perangs" (the "macheta" of the Malays) and "klewangs" (the largest battle-sword of the Malays) tried, by cutting copper coins in two, without showing marks on the edges (this often) and once a wrought nail with a like result. It would be almost impossible to induce Chinese merchants to adopt our edge tools."

American carriages only fail to sell in Singapore because not adapted in their proportions and other points of construction to the country. Our harnesses, too, though excellent in their way, need

modification. A good deal has been said of the growth of our cottons goods trade with China, but Consul Stevens of Ningpo reports somewhat discouragingly. The difficulties our merchants have to encounter may be understood from the following extract:

The importation of American cotton goods into this port continues to a limited extent. It does not increase very fast, cheaper and poorer goods from the continent of Europe and England being seemingly preferred. The custom houses of China are almost entirely filled by Englishmen; the secrets of the Chinese trade are known to them; they can post their friends at home, and do. Nearly all trade of this port is confined (outside of opium, in native hands, all the goods being imported under the commutation system; foreigners are entirely out of the trade. The commutation system is this: merchants club together and buy the right of all superior importation. By so doing the foreign merchants who only pay half duty, according to treaty, can be undersold. Say what you will, no foreigner can take advantage of this commutation system; he can't get in it; it's a Chinese ring. If you are not in the ring you can't trade. This commutation system, like all rings and systems has built a monoply, and so far as the cotton goods trade of Ningpo is concerned, it is governed entirely by them. The Chinese are moving quietly but surely in adopting foreign ideas. It will not be in my judgment eighteen months from to-day till you will see in Shanghai one of the best cotton mills ever constructed and working.

We shall continue our notice of these Reports in our next issue.

THE appointments made by the President for the Tariff Commission is taken generally as an earnest that the modifications suggested will be such as will simply deal equitably, in the interests of protection, with duties needing revision owing to lapse of time and changed conditions. No tariff is essentially immutable; the working of the most carefully prepared schedules is apt to disclose the need of amendments. The course now taken in the appointment of a Commission is the very best for ascertaining the merits of the complaints of our manufacturers and merchants. To the encouragement of American industries all tariff changes must be subordinated to find acceptance with the mass of the nation. As a Philadelphia contemporary remarks, the duty of the Commission will not be so difficult as laborious. It will not be difficult, because it has not to decide anything relating to policy so far as the main question is concerned. That is already decided. It will be a duty involving much labor and painstaking, because the time is limited as to performance, and because the data cannot be collected from books in the quietude of the library. The data must be obtained at the sources of industrial energy. Men actively engaged in production will have to be examined, and the resources of every important branch of industry will have to be gauged as perfectly as time will allow. It is to be a quest in search of the equities pertaining to a vast and various series of industries. The interdependence of these multiform enterprises is acknowledged. Nobody denies that they are parts of a whole which constitute the sum of national greatness. Hence there is no field for doctrinaries on such a Commission. It is not to be an arena for disputation. It is not to be a school for the elaboration of the abstract. It is to be an inquiry into the needs and demands of the domain of energy devoted to the development of national resources. The inquiry will relate strictly to the concrete. It is not even necessary that a single professor of political economy shall be found on such a Commission.

THE position of our foreign trade, so far as indicated by imports and exports at New York is presented in the following figures: The value of the merchandise imported last week in New York was $7,158,538, being $678,661 less than for the same week of 1881, and the value of the merchandise exported from New York for the week was $7,034,397, being $674,680 less than for the week of last year. The result of the movement is a debit against the port of $124,154 for the week of this year, against a credit of $128,135 for the week of 1881. For the twenty-five weeks since January 1 this year the value of merchandise imported is $38,065,587 greater than for the corresponding time in 1881, while the value of the merchandise exported is $33,088,009 less; difference against the port, $71,153,496. For the twenty-five weeks of last year the imports exceeded the exports only $24,440,753; this year the imports exceeded the exports $95,549,240; difference, as before stated, 71,153,496. Last year the specie imports at that port to date amounted to $29,811,522; this year to $1,915,240; decrease, $27,896,282. This year the specie exports to date amount to $33,983,686; last year to $5,293,708; increase, $28,689,087—a difference in the specie movement to the credit ofthe port of $56,589,260.

MANUFACTURES.

TO MACHINISTS. MANUFACTURERS AND OTHERS.

THE publishers of THE TRADE REVIEW solicit items of information concerning manufacturing and other establishments in any part of the country, and all such items will be promptly inserted in these columns, free of charge. Facts are the only things needed; and all communications should be accompanied with the name of the contributor—not for publication—but as a guarantee of good faith.

Manufacturers, machinist and engineers are particularly requested to communicate any matters of interest relating to their specialties. No one need be deterred from sending any interesting facts in his own anguage, as all such contributions will be properly revised befer sendin to press.

OHIO INDUSTRIES.

AN Ironton concern has sent a shipment of coal cars to Cuba.

WORK has commenced at the Ironton Hoe and Tool Company's establishment.

THE molding room of the foundry of Jones & Claypool, Youngstown, is being enlarged.

THE Parker Carriage Goods Co., Cincinnati, has been incorporated with a capital of $30,000.

THE Ohio Falls Car Works have closed down for lack of work—600 men are out of employment.

THE Chemical Manufacturing Co., of Cleveland, has been incorporated with a stock capital of $50,000.

THE Whipple Mfg. Co., Cleveland, have completed their extensive works for the manufacture of builders' hardware.

MESSRS. John McCloskie and J. Baird, who lately went into the pottery business at Orville, are meeting with great success.

TAPLIN, Rice & Co., Akron, who employ 150 hands, have purchased the Sieberling Machine Works, which are now in running order.

THE Mingo furnaces, at Mingo Junction, have been banked up on account of the labor troubles. The building of the company's new nail works will be completed during the coming autumn.

PORTZ & Co., founders and machinists, Fostoria, have lately made twelve castings, each weighing nearly 2,000 pounds, and twelve weighing each 800 pounds, being the largest castings yet made in that city or its vicinity.

THE Lechner Mfg. Co., Columbus, manufacturers of the Lechner mining machines and anti-friction roller detachable chains for transmitting power, are very busy, and are at this time working upon some good orders for both the chains and mining machines.

MESSRS. Johnson Bros. & Luper, Cincinnati, are about embarking in the hardware jobbing business, and are making preparations to largely increase their present operations. They are handling the Westphal patent screw case, and Porter's window and door screens.

CONTRACTS have been recently closed with several large engine builders, by the Miller Company, of Canton, for their "Torrent" and "Unique" pumps. On account of the increased demand for these pumps, the company contemplate the erection of extensive additions to their works, plans for the same being under consideration.

I. N. TOPLIFF, East Prospect street, Cleveland, manufacturer of the tubular bow socket and specialties in carriage hardware, employs about 60 hands in this city, in addition to those engaged at his branch works at Olmstead, where the bows are manufactured. This is one of the growing industries of Cleveland.

MCDERMID & WILLIAMSON, 20 Perkins Power Block, Cleveland, manufacturers of twist drills, and whose specialties are reamers and special tools, are doing a fine business, although they only commenced operations on May 1st of this year. They are essentially representative manufacturers in their line, and pride themselves on the good quality of their manufactures.

MEMBERS of the Amalgamated Association of Steel and Iron Workers are about to establish a co-operative rolling mill at Leetonia, where a bargain has been closed for the purchase of an old, unused mill. The persons engaged in the enterprise will fit it up at once with the largest improved appliances, and begin work in the fall.

THE Poppenheimer Hardware Co., Cincinnati, have taken new and more commodious quarters on West Fourth and McFarland streets, where, with greater facilities for carrying, exhibiting and shipping goods, and with a largely increased stock, including many new lines, they hope to merit the continued patronage of their old friends as well as of the trade in general.

THE Greenwood Machine Co., Columbus, have reorganized under the title of Vulcan Iron Works, with the following officers: W. S. Ide, President; R. T. Clark, Manager; James Greenwood, Vice President. The works will hereafter be devoted to the manufacture of a line of machine tools controlled by the new company, prominent among these being the Vulcan steam hammer.

THE Youngstown Malleable Iron Company are about making a new addition to their works, 70 feet wide and 150 long. In addition to filling orders for the jobbing trade, the concern will manufacture the following goods: Lambert's malleable iron felloes, Oviatt's "Common Sense" riser and lock, and the New York "German" and "Victor" harness snaps. With the new addition completed, and the establishment running full it will furnish employment to 125 persons.

A MAJORITY of the white ware potteries, East Liverpool, have shut down. J. Wyllie & Son declare their intention of running right along. The stocks are generally pretty heavy, and the operators seem to think they can continue to fill orders as they may come in, for some time to come. They will be apt, however, to soon begin to run short on some staples. All in all, the opinion does not seem to be prevalent that the suspension will be a long one; a couple of months—possibly more, probably less. But how the labor difficulty will be terminated cannot easily be conjectured.

THE Eureka Lamp Manufacturing Company, Cleveland (successors to Eureka Lamp Co.), have moved their shops from Seneca street to the large and spacious establishment situated on the C. & P. R. R. near Euclid avenue. This firm is the most prominent in Ohio for lamps and cuspadors. The mechanical skill and suggestive inventiveness they have brought to bear on their productions have given them a reputation not only in Ohio but surrounding States. In addition to the production of lamps and cuspadors they manufacture brass specialties. An increase in the number of employes is contemplated. Trade is good and extends to all parts of the country.

THE Columbus Buggy Company, composed of George M. Peters, Clinton D. Firestone, and Oscar G. Peters, was organized in 1875, and the business of the company has grown so rapidly and been pushed with so much energy that the concern now has a capacity to turn out seventy-five buggies per day. The Peters Dash Company, in the same interest, and occupying the same premises, has capacity for 1,000 dashes per day. The works are running full time, and many of the departments are operated during part of the night. About 600 persons are employed, and a fair estimate shows that 2,000 people draw their support from the institution. To meet the demands of the trade, branch sale houses have been established at Indianapolis, Cincinnati, and Kansas City. Fifty-two forges and any number of power hammers are in full operation. Shipments are made to all countries.

MR. CHARLES MILLER, Columbus, is manufacturing on a larger scale than ever his Buckeye cylinder oil, which is free from acids and neither gums nor corrodes the cylinder.

WE had formerly occasion to notice, with high commendation, the productions of the Cleveland Stained Glass Works, 101 Public Square, Cleveland, established, by no means too soon, to minister to the growing taste for house interior and church decoration. The proprietors, Messrs. A. F. Sterneberg & Co., have brought to their business the highest qualifications, and it is no matter of surprise that they should have found it necessary to take possession of the whole building. The structure is three stories high, with ample basement. On a recent visit we had the pleasure of inspecting some very neat designs in stained glass windows, executed to the order of one of our leading citizens, for the purpose of setting off his mansion. There are many positions in private residences in which stained glass, in addition to beauty of appearance, advantageously subdues the direct rays of the sun, whilst as introduced into church windows it aids in giving that "dim religious light" so much in keeping with religious aspirations.

THE Ætna Machine shops, Warren, have just turned out a model piece of machinery, the invention of the proprietor, Mr. F. I. Freeman, that experienced mechanics claim will work a revolution in the price of engines designed for operating saw and grist mills, hoisting apparatus, etc. It is an upright engine, the base, upright cylinder, steam chest, slides and pillar-stock being cast in one piece, which secures great firmness, and naturally reduces the expenses of planing and bolting the parts together. The engine has a reversible link motion, and runs without a bolt to hold it, 300 revolutions per minute. The pitman is made of solid cast steel with heavy brass boxes, which effects a saving of at least $50 for connections alone. The valve rods, piston rods and wrists are of the best quality of steel, the shaft of hammered iron. The smoothness and harmony with which the different parts work must be seen to be appreciated, and we can assure our readers that the engine is a model of neatness and design. The patentee will guarantee these engines perfect and satifactory in every respect, and will take pleasure in exhibiting the practical workings to any person interested in machinery who will call at the works.

THE Canton Car Works are in full activity. The wood department is a building 40x220 feet. The erecting shop is 64x180 feet, with ten erecting stalls and tracks connected by a transfer turn table, which runs the full length of the building. The wheel, axle and truck shop is 40x80 feet, and contains two setting-up tracks. The machine shop adjoins the main building, and is 60x80 feet, and is 60x80 feet, and finely equipped. The blacksmith shop is 30x180 feet, containing 17 forges. The foundry, which is said to be the finest in the State, is 80x120 feet. There are two cupolas, with a combined capacity of forty tons. In addition to the railroad castings they do all kinds of job castings. Two engines, a Corliss, of 80-horse power, and an Allegheny, 40-horse power, are used to run the works, and in addition to the building of all kinds of freight cars, the company manufactures dumping cars and feed mills. The shops and yard cover about eight acres. The company have a capacity of ten cars a day. At present nearly 100 hands are employed, and that number will be increased. They are at present working on a large order for box and cattle cars, for the Cleveland, Akron & Columbus Railroad, and are also furnishing castings for this road and the Connotton Valley. The Company has an abundance of capital, and is managed by men of experience, and from the present outlook the works will probably come to be the leading one of the kind in the State.

AKRON, among other establishments, has two extensive reaper and mower works; one large rolling mill; one car-axle mill; one mower and reaper, knife and sickle manufactory; two extensive machine shops (engines and mining machinery specialties) the largest friction match manufactory in the United States, if not in the world; four large planing mills; four carriage manufactories; chain works; rubber works for flexible and hard goods (fire hose and belting specialties;) cutlery works; roofing tile; fire brick; four of the largest sewer-pipe works in the world; extensive fine and common stone ware factories; manila paper mill and paper bag manufactory; straw-board works and a large variety of minor manufactures and industries, representing an annual product of $12,000,000; the product of mowers and reapers, and the milling interest alone reaching $6,000,000.

The Akron Iron Company employ 275 men. The greatest interest in Akron is the famous Buckeye Mower and Reaper Works, where between six and seven hundred men are employed. The Buckeye machine originated in Canton, O., more than a quarter of a century ago. In 1863, C. Aultman & Co., of Canton, started a branch house in Akron, which in 1865 became independent, and was incorporated under the name of Aultman, Miller & Co. Their works have been steadily prosperous and repeatedly enlarged until the present floor space is about seven and one-half acres. The value of the product for the harvest of 1882 will exceed $3,000,000. The great prosperity of Akron is due very largely to this concern, as it was it which first attracted attention to the city as possessing unusual manufacturing advantages. It has served as a sort of magnet in drawing other important industries there.

The largest match factory in the United States is located in Akron, having been established in 1837. Nine-tenths of the work incident to turning out a match ready for sale is performed by ingenious machinery, and yet the company employ some three hundred operatives, two-thirds of the number being girls. There is one man in their employ who has worked at the same machine for nearly thirty years, and has made matches enough, if placed end to end, to reach round the world ten times, and both man and machine are still in good order. The product of the work is 2,575,000 matches per day, or about seven million a year, consuming seventy tons of brimstone, 10,400 pounds of chlorate of potash, 30,000 pounds of glue, 50,000 pounds of paraffine wax, 150 tons of other paper.

MASSACHUSETTS.

THE Walworth Manufacturing Co. employs in all about 400 men. The work turned out includes all descriptions of cocks and valves and all kinds of tools used in this business. They manufacture steam heating apparatus of every description.

NEW stove-lining works are nearly completed at Taunton.

THE Ames Mfg. Co., of Chicopee, have increased their capital stock from $250,000 to $500,000. They are employing over 550 men, and have a year's orders on hand. The sword department is running full, and the machine shops, among other things, are turning out 75 sewing machines a day for the Eldridge Co., on a contract for 50,000.

THE Morgan Silver Co., of Boston, with a capital of $16,000, for the manufacture and sale of plated ware, has been organized.

RHODE ISLAND.

THE Pawtucket Mfg. Co. is erecting a building 153x120 feet for the manufacture of bolts, nuts and machinery.

THE Suffolk Iron Works of Boston has been incorporated with a capital of $100,000, for casting, annealing and finishing metals, and cognate operations.

MARYLAND.

THE Walker Horseshoe Co., which was recently organized in Baltimore for the manufacture of Walker's well known hammered horse and mule shoes, will at once contract for the erection of their buildings, consisting of the shoeshop (which will be 75x180 feet), storage warehouses for kegs, shoes, and other necessary structures. The machinery, tools, etc. have already been bought. The entire improvements will cost $200,000. The Walker horseshoes were formerly manufactured in Troy, N. Y. The officers of the company are: President, Samuel G. B. Cook; vice president, W. G. Atkinson; treasurer, Oliver C. Zell; secretary, C. P. Paine; superintendent, James T. Walker.

CONNECTICUT.

THE Yale Clock Co., New Haven, have received orders for 1,000 pendulum clocks in bronze cases, each from Tsin-Tsin and Hong Kong.

THE Norwich Nickel Works occupy the large brick building connected with the factory of the Hopkins & Allen Mfg. Co., the largest pistol manufacturers of Norwich. They plate the product of the six pistol factories of Norwich, together with the product of the Richmond Stove Co. of the same place. The works are especially fitted up to plate pistols, guns and stove work. The works were removed to their present quarters in January, 1882, where the facilities for rapid and systematic handling and prompt delivery are very much increased.

THE Bridgeport Malleable Iron Works will put up a new factory about 1,200 feet long west of their present factory, and employ several hundred additional workmen.

NEW YORK.

AT the annual meeting of the Rome Iron Works Co. at Utica on June 24, a change of directors was made, and Addison Day was elected president. Rail making has not yielded satisfactory dividends, and it is now proposed, on the recommendation of the committee sent to Pittsburgh, to change the mill into a manufactory of skelp iron, toe-calks and steel agricultural implements.

THE Brooks Locomotive Works, Dunkirk, now employ 1,000 men, and are running night and day. Eighteen engines are turned out every month.

THE McQueen Locomotive Works, Schenectady, have filed articles of incorporation, with a capital stock of $300,000. The works are to be located near the crossings of the New York Central and Delaware & Hudson Canal Cos.' tracks.

THE Cayuta Wheel and Foundry Co., Waverly, have a monthly product of 3,000 wheels, besides other castings.

THE Chicago & Atlantic road have recently ordered 40 new engines from the Brooks Locomotive Works, Dunkirk.

VIRGINIA.

THE Garfield Locomotive Works is a new plant which is soon to be in operation in Garfield; $500,000 have been subscribed and work will be begun on the buildings at once. Contracts have been awarded for the erection of buildings to cost $102,000. They will be completed in three or four months.

MISSOURI.

ST. LOUIS is fast coming to the front as the great cotton mart of the interior. Among inland cities she stands foremost, Houston, Tex., alone excepted. Her business increased from 60,000 bales in 1874 to 480,000 bales in 1880. More than $1,250,000 have been expended by her citizens for cotton compress establishments, and the new Cotton Exchange just opened cost $100,000.

THE Duggan Parker Hardware Mfg. Co., of St. Louis, a recently incorporated organization, are erecting a new reverbratory furnace to melt 60,000 pounds per day. They will employ 80 molders.

MICHIGAN.

DETROIT may well feel proud in the push and enterprise shown by the new firm of W. C. Bennett & Co., edge tool and knife manufacturers, successors to the Old Novely Works on Brush street. Since those works shut down the city, as well as the lumber districts throughout the State, have been obliged to send East for their knives and edge tools. The present firm has put the institution on a solid basis; their business is steadily increasing, and orders are pouring in on them to such an extent that they have to work overtime. They are enlarging the works by building additional forges, and are putting in new machinery. By the first of August they intend to double their working force, a course necessary to enable them to keep up with their orders. The revival of this branch of businees is to be welcomed as an important accession to Detroit's many industries, and appears destined to afford another brilliant illustration of the loosening of the West from dependence on the East in prime articles of production. Messrs. Bennett & Co. have been fortunate in securing the most expert hands in the lines they produce, tobacco, stave, planing, moulding and paper knives, as well as all descriptions of edge tools.

STACK No. 2 of the Pioneer Furnace was blown in about June 1, and promises a long and successful run.

INDIANA.

A NEW double puddling furnace is being erected at the nail works in Terre Haute, at a cost of about $1,300. It is the only one of the kind in the State, although quite common in the East.

THE Johnson Malleable Iron Works, Indianapolis, have been sold to some Eastern parties, who will resume the business with 400 to 500 men.

ILLINOIS.

THE Columbiana Iron Foundry and Machine

Tool Works, Chicago, are placing in their establishment about $25,000 worth of tools, which will largely increase their capacity. Their new machine shop, the foundations for which are being already laid, will be 144x100 feet and three stories in height.

THE Moline Malleable Iron Works have 125 hands employed and have just completed four new double annealed ovens, which gives a capacity o about 250 tons per month. The company make a specialty of Hill's agricultural wrench and Hill's singletree clip and hook.

PENNSYLVANIA.

THE new vertical steam hammer that will be erected in the steam forge of the Reading Iron Works, reading, in place of the old Kirt tilt hammer, removed, will strike a blow of about 3,000 pounds. There are three hammers in this forge, one of which strikes a blow of 10 tons. The other two are 5 and 3-ton hammers. Some of the heaviest forgings in the United States were made at this forge.

THE Table Cutlery Manufacturers' Association held a meeting in Pittsburgh recently, at which present prices were confirmed for the fall season, except on iron handles and 1878 tables.

A COMPANY composed entirely of Pittsburgh capitalists, under the style of the Webb Tool Co., are putting their building on North avenue, Allegheny, in shape, and expect to be in operation by the first of September. They intend to manufacture twist drills and small special tools of all kinds.

CORRESPONDENCE.

HAMILTON INDUSTRIES.

[FROM OUR SPECIAL TRAVELING CORRESPONDENT.]

HAMILTON, Ohio, June 26, 1882.

THE Long & Allstatter Co. employ 150 hands. They have been established 30 years, and do a general shipping trade in their productions, which include plows, hay rakes, cultivators, feed cutters, reapers and mowers. They also manufacture largely power punches and hammers. The last named goods are exported to foreign countries by manufacturers' agents. Trade is very good at the present time. They are way behind on the orders. Mr. John M. Long is President, Mr. Robert Allstatter, Vice-President and Superintendent, and Mr. C. E. McBeth, Secretary and Treasurer.——Bentel, Margedant & Co., the well-known manufacturers of universal wood workers, band saws, scroll saws, and wood machinery in general, employ 100 hands. The firm has been established 14 years. Their customers are to be found in every part of the Union, and they make heavy shipments to Canada, besides engaging in the European export trade. Orders have come in briskly the past season, and prospects are encouraging. In their endless band saw machine I noticed a well-arranged slipping contrivance on the periphery of the upper band-wheel. They have introduced into the jig scroll saw an ingeniously contrived steel spring which affords an easy motion with equal stretch of the saw-blade, thus tending to permanence in efficiency. Their machines are noticeable for the admirable style in which they are finished. The The firm received first premiums at the successive Cincinnati exhibitions extending from 1870 to 1880, inclusive.——I have just returned from a visit to the Monarch and Eclipse Machine Works, the proprietors of which are Messrs. Hooven, Owens, Rentschler & Co., successors to J. O. Hooven and Owens, Lane & Dyer Machine Co. At these works may be witnessed on a large scale the manufacture of portable and stationary engines, threshes and saw mills. No less than 200 hands are employed. Among solid enterpries the works hold a prominent position. They were established in 1880. Shipments are made to the West and Southwest. Their trade is a growing one, and last season witnessed a vast amount of business. I may mention that their shops cover six acres. Their machinery is entirely driven by steam. The engine is of 80 horse-power. The citizens of Hamilton are justly proud of the engineering reputation built up by this firm, and of the vast extent of their transactions. The members of the firm are J. C. Hooven, Jos. P. Owens, G. A. Rentschler, George Helvey, Henry Sohn, Jas. E. Campbell.——The Cope & Maxwell Manufacturing Company, whose productions include water works, sewage, mining pumping engines, and every variety of steam pumps, have carried on the business 18 years, and been located in their present establishment eleven years. They employ on an average 100 hands, and ship all over the Union. I learn from them that trade the past season was very good. Prospects not so flattering, although they have a good healthy trade. Size of main machine building 45x400 feet, with an L of 128 feet long, 45 feet wide, 2 stories high; foundry 150x45 feet. All brick and slate roofing. Mr. J. C. Morris is President; Mr. J. R. Maxwell, Vice President; and Mr. Ezra Cope, Secretary.——At the Ohio Iron Works, corner of Fourth and Vine streets, the proprietors of which are Messrs. Henry Sohn and George A. Rentschler, are manufactured shelf-hardware and all kinds of gray iron castings; machinery also is made to order. The firm has been established seven years, and employs 70 hands. The trade is principally local; they have, however, some shipping trade. Their orders for the past season, and those on hand, have proved very satisfactory.——Ritchie & Dyer Co., (Owens, Lane & Dyer Machine Co.,) manufacturers of road engines, circular saw mills, head blocks, and general machine dealers, employs thirty hands and have been established 20 years. Shipments are made to the Eastern States. Trade the past season is reported to have been very good. The present season's outlook is most encouraging.——The Central House, formerly Phillips House, the proprietors of which is Mr. J. C. Barcalow, who has been running the hotel the past five years, has every comfort and convenience that could be desired, including a first-class table, and airy and well-furnished rooms. Tne clerk, Mr. John Cummings, is the pink of affability and politeness. Hotel keeping is an art which Mr. Barcalow has evidently thoroughly mastered.

PIQUA INDUSTRIES.

PIQUA, MIAMI Co., O., June 26, 1882.

FROM OUR SPECIAL TRAVELLING CORRESPONDENT.

Piqua, of which the world in general will hear more hereafter in the way of manufactures, is beatifully situated, and possesses not a few interior attractions. The town is 28 miles north of Dayton and 114 miles south of Toledo. The population numbers 8,000, and there is an abundance of public spirit and enterprise. Two railroads enter it—the Pan Handle and the D. & M. lines. Education is provided for in three Primary Schools and one High school. Its manufactures include three linseed oil works, three paper mills, one woolen mill which makes a specialty of paper Makers' felts, three grist mills, and three carriage establishments, the largest being the Spiker Carriage Works. The city has one of the best systems of water works in the State, constructed on the Holly system. It has also several churches, and there are splendid Fair grounds, as well as a first class race track, being a mile track. The streets are all wide and kept in good order. Several of the mills are run by water power, this locality being provided with one of the best water powers in the State, having a fall of 56 feet. The shade trees planted in front of every residence afford delightful vistas and shady walks. There are two first class hotels—the City Hotel and the Bassett House—which are replete with comfort. Your readers will probably wish to learn more in detail respecting Piqua's manufactures. First, then, let me mention the works of the Spiker Wagon Company, where are manufactured carriages and wagons. These works were established 18 years since. The buildings are all of brick, three stories and attic, and stand on seven acres of land, covering a little over one third of the same. The company turn out 250 light carriages a year, and also manufacture 18 wagons per week. This is one of the most complete establishments of the kind to be found in this section of the State, and the work is equal to if not better than any other establishment. They report trade extraordinarily good, finding it almost impossible to fill orders with the promptitude that customers demand. Seventy-five hands are constantly employed. Mr. R. P. Spiker is president and M. S. Genslinger secretary and treasurer.——L. C. & W. L. Cron & Co., manufacturers of furniture, employ 160 hands. They have been established in the business twenty years, and ship to Ohio, Indiana and Kentucky, their principal trade being in this State. At present business is somewhat slack, but was excellent last season.——The Piqua Handle and Manufacturing Company have been in business three years and employ 45 hands. They carry on a general shipping and also a large export trade. Business the past season has been good, and present orders are satisfactory. They manufacture rakes, weeders, hoes, forks, and all kinds of finish ash handles. Mr. R. M. Murray is president; Mr. W. C. Gray, treasurer; Mr. H. C. Nellis, vice president, and Mr. H. H. Bassett, secretary.——Messrs. Cron, Kills & Co., manufacturers of safes, cupboards and extension tables, employ 50 hands, and have been established a little over one year. Their trade is very good. They ship all over Ohio, Pennsylvania, Indiana and West Virginia, and have also some trade with Kentucky.——The machine works of W. R. Bowdle, manufacturer of steam engines, mill machinery, shafting, etc., employs seven hands. The works were established in 1848. The trade is principally local.

DAYTON INDUSTRIES.

[FROM OUR SPECIAL TRAVELING CORRESPONDENT.]

DAYTON, Ohio, June 27.

To judge by the manufacturing going on here, Dayton would hardly seem to have experienced any check to business ——Messrs. Brownell & Co., 437 E. First street, founders and machinists, manufacturers of stationary and portable engines, boilers, sheet iron work, saw mills and feed mills, employ on an average 140 hands. Their works have been in operation three years. Their general shipping trade, which is flourishing, is to the Southern and Western States. The members of the firm are Mr. John R. Brownell and Mr. Martin Schneble ——The Crum & Sefton Manufacturing Co., (successors to Aulabaugh, Crume & Co.,) make as specialties paper and wood grocers' plates, oyster pails, berry pails, ice cream and candy boxes. They have 175 hands in their employ. Their business was established five years since, and has been continually a growing one. The demand for their goods comes from every State.——The Stilwell & Bierce Manufacturing Company, sole manufacturers of Stilwells lime extracting heater, Victor turbine, Odell's roller mill, and eclipse double turbine, employ 90 hands. They were established in 1870 as a corporation. The company ships all over the United States and to foreign countries. Trade which has been very good the past season, is very favorable the present one. Mr. E. R. Stilwell is president, Mr. R. N. King, Vice President and Treasurer, and Mr. G. N. Bierce, Sec'y.——S. N. Brown & Co., manufacturers of wheels, hubs, spokes, bows, shafts, poles and yokes, also of the Trade Wagon, employ 150 hands on an average. They were established in 1848. The firm ships all over the Union. Trade is reported very good.——The Buckeye Iron and Brass Works employ 150 hands in their line of goods, the making tobacco and linseed oil machinery, machinists' tools, engines, and as steam and water fitters. They were incorporated in June 1876. Orders on hand are sufficient to keep them going for several weeks.——The Globe Iron Works, (Stout, Mills and Temple,) established in 1827, employ 200 hands. They ship all over the country. Their corrugated and smooth chilled rolls, of which they are the patentees, are regarded as unexcelled in desirable qualities. Trade continues satisfactory.——Smith, Vaile & Co., builders of steam pumps and hydraulic machinery, contractors and builders of water works machinery, employ 90 hands. They have been established 7 years, and do a general shipping trade. The last season was a most prosperous one, and they continue full of orders. Their pumps are made of all sizes to suit the trade.——The Dayton Wheel Works, Pinneo & Daniels, is renowned for the fine carriage wheels turned out, and generally for its wheel-stock; all kinds of bent material for carriages is supplied. The works have been in operation twenty years, and employ 75 hands. Shipments are made all over the country. The present outlook is satisfactory.——Mr. John Dodds, manufacturer of Hollingsworth, improved Reindeer, Taylor's surprise, and red bird sulky hay rakes, has 125 hands in his employ. He has been in the business twenty-two years. He ships to the West and North-West. Last season was an immensely prosperous one with him, and he looks to increasing sales.——The Woodsum Machine Company, manufacturers of the celebrated Dayton threshing machines, horse powers, and portable engines, keep constantly busy 80 hands. The company, which has a thriving business, commenced operations thirty years since. Shipments are made to Ohio and Western States. Mr. S. F. Woodsum

is President, Mr. George W. Shaw, Vice-President and Treasurer, Mr. J. F. Perrine, Secretary, and A. J. Patterson, late Vice-President Pitts Agricul tural Works, Buffalo, New-York, is superintendent. ——The Dayton Malleable Iron Company, 1317 to 1321 West Third street, manufacturers of carriage hardware, and who make to order malleable grey iron and brass castings, report more orders than they can fill in three months. They have 125 hands and expect to build in July, and to increase their force to 160, which is necessary to enable them to fill their orders promptly. Mr. Thomas Gaddis is President. and Mr. H. E. Parrott, Treasurer.——The Dayton Boiler Works, 401, 403 and 405 E. First street, were established in 1855 for the manufacture of steam boilers and all kinds of heavy sheet-iron works. The proprietors are Messrs. E. H. Brownell & Co. They employ 70 hands, and carry on a large and active trade principally in the Southern and Western States. Business prospects with them are capital.——The great merits of Bayley's Duplex Guage are so well known to engineers that I need not dwell on them. In Dayton Gauge Works, 32 North Jefferson street, of which Mr. O. W. Bayley, its inventor, is proprietor, they are to be seen in the several stages of construction. A steady demand is maintained for the Duplex as well as for the Bourdon or Ashcroft Gauge, neither of which can be beat. Bayley's Improved Duplex Gauge is specially adapted to locomotives. It was patented on February 5, 1878, and based, as it is, on absolutely correct principles, has held its own.——Mr. A. A. Simonds, manufacturer of engine bars and plates for paper mills, planing machine knives, and various kinds of pattern knives, has a good business in his line. He has manufactured machine knives for eighteen years, and has established a wide reputation for the superior quality of his productions. Mr. Simmonds employs 25 hands. He ships principally to the East, but has some southern and western trade. ——A large business is being done by the Dayton Awning and Tent Company, which was established in 1861, in the manufacture of awnings, tents and shades for store fronts, doors and windows, oiled and plain water-proof canvas covers for wagons, drays and horses, also cotton duck and canvass belting and hose. Their work goes to nearly every State in the West and South. They furnish military companies, fishing parties, picnic parties, croquet, archery and other amusement seekers, with every desirable shape and size of tent. In this special business they are regarded as unexcelled. Mr. D. W. Winters is Manager, and Mr. E. T. Winters, Superintendent.——G. T. Roberts & Co., Central Machine Works, 38 St. Clair street, manufacturers of steam pumps, hydrants, machinery, shaftings, and metallic castings, &c., employ eighteen hands. They have been established 12 years. Trade is excellent. They are about building a large shop, brick, size 75x68, 3 stories, and expect to locate there in some 90 days. Their principal shipments are to the West and South.——Messrs. Joyce, Cridland & Co., corner of Wyandot street and railroad, manufacturers of J. O. Joyce's patent lever, compound lever and screw jacks, and repairers of machinery, have been established six years. Their principle trade is with the railroad companies.——At the Phœnix Brass Foundry, Third street, opposite Madison, (James Whitehead,) the hands are busy in turning out machinery and ornamental brass castings, metalic pattern letters and figures. Steam pump and railroad work is a specialty. The foundry has been in operation for four years.——In closing my letter I must not omit mention of the Phillips House, located in the center of the city. It affords all the accommodation guests could desire.

THE latest forestry bulletins, just issued under the census of 1880, illustrate another source of wealth in the South. The marketable timber of North Carolina is estimated at 5,220,000,000 feet, board measure, mostly long-leaved pine. Louisiana still has 26,588,000,000 feet of long-leaved pine and 21,625,000,000 feet of short-leaved pine. Georgia is credited with 17,778,000,000 feet of long-leaved pine, South Carolina with 5,316,000,000 feet, and Arkansas with 41,315,000,000 feet of short-leaved pine. Last year's lumber season was one of the most successful ever experienced in the Northwest.

"BLUE GRASS ROUTE OF OHIO."—The Cleveland, Akron and Columbus Railroad.

MECHANICAL RECEIPTS AND ITEMS.

To Mend a Rubber Belt.

One method is to melt common isinglass in water, the same as ordinary glue; add a little alcohol and apply hot. Another is equal parts of shellac and liquid india rubber, the shellac to be dissolved in alcohol by putting both in a tightly-corked bottle, standing in a warm place, and shaking occasionally. It should be quite thick. After a rubber belt has begun to wear out, it is better and cheaper to get a new one than to mend it.

To Recut Files and Rasps.

To recut by a chemical process dissolve 4 ounces salaratus to one quart of water, sufficient to cover the files, and boil them in it for half an hour; then take out, and dry them; then stand them in a jar, fill it up with rain water and sulphuric acid in the proportion of 1 quart and 4 ounces acid.

To Make Crystalized Tin-Plate.

Crystalized tin-plate has a variegated primrose appearance, produced by applying to it in a heated state some dilute nitro-muriatic acid for a few seconds, then washing it with water, drying, and coating it with lacker. The figures are diversified according to the degree of heat and relative dilution of acid. Place the tin-plate slightly heated over a tub of water, and rub its surface with a sponge dipped in a liquor composed of four parts of aquafortis, and two of distilled water, holding one of common salt sal ammoniac in solution. Whenever the crystalline spangles seem to be thoroughly brought out, the plate must be immersed in water, washed either with a feather or a little cotton (taking care not to rub off the film of tin that forms the feathering), forthwith dried with a low heat, and coated with a lacker varnish; otherwise it loses its lustre in the air. If the whole surface is not plunged at once in cold water, or if it be partially cooled by sprinkling water on it, the crystalization will be finely variegated with large and small figures. Similar results will be obtained by blowing cold air through a pipe on the tinned surface, while it is just passing from the fused to the solid state.

To Purify Solder.

For purifying solder after it has been used to wipe a joint on iron pipe, when cold is used to tin the same, use a mixture of resin, tallow and sulphur in equal parts. Solder cannot be thoroughly cleaned so as to be as good as new, except by an oxidation refining, which cannot be done profitably on a small scale.

Soldering Cast Iron.

Soldering cast iron, says the *Engineer*, is generally considered to be very difficult, but it seems to be only a question of thoroughly making bright the surface to be soldered, and using good solder and a clean swab with muriatic acid. Sodium amalgam might be usefully employed for the purpose.

To Prevent Leaking Joints.

When rubber plates and rings are used for making connections between steam and other pipes, leaking of joints may be prevented by using a cement prepared by dissolving shellac in ammonia. The pulverized gum shellac is soaked in ten times its weight of strong ammonia, when a slimy mass is obtained, which in three or four weeks will become liquid without the use of hot water. This fastens well both to the rubber and to the metal or wood, and becomes by volatization of the ammonia hard and impermeable to either gases or fluids.

Dimensions of Boilers.

The following rule for dimensions of boilers is recommended by good authority: For each nominal horse power a boiler should have one cubic foot per hour, one square yard of heating surface, one square foot of fire grate surface, one cubic yard capacity, twenty-eight square inches flue area, eighteen inches over bridge.

Smooth Surface to Castings.

When it is desired to give a smooth surface to large castings in green sand, the dusting with charcoal dust is dispensed with. Instead of that the print is painted over by means of a brush with a mixture in water of ½ plastic clay and ½ charcoal dust. A further polish may be given with an iron tool.

When writing to advertisers mention this paper.

The Faure Accumulator.

The following is probably the first clear detailed account our readers have met with of the structure and mechanical application of the Faure accumulator which is now being brought into use in this country. The inventor, Faure, claims that within a year he will run a locomotive with it at the rate of two hundred miles per hour. It is stated that four dollars per day will cover cost of energy on a car. Light and power can be furnished by the same accumulator, and renewing is required every three hours. The escape of electricity after generation is prevented by oxide of lead. The metallic cases in which the generation is effected are fitted with plates. The plates are prepared in this way. A sheet of lead rather smaller than the interior of one side of the box is cut out and perforated with small holes of about three-sixteenths of an inch in diameter. On this plate a layer of red lead, mixed with acidulated water, is placed. First, one side of the plate is prepared; then, covered with a sheet of parchment, the plate is turned around and the same operation repeated. Around the outside of the parchment a cloth jacket is sewn, so as to completely contain the plate, leaving only a small portion at one corner to form an electrode. The negative plates are prepared in a precisely similar manner. When this is completed, the fourteen plates which are placed in the box are parallel to each other, with their electrodes standing up at either end. A cover is then fitted to the box, and the electrodes at each end are united together and connected with a brass terminal. The next operation is to produce a change in the interior of the accumulator, so that it can absorb and give out the quantity of electricity required. To do this, the accumulator is filled with acidulated water until the plates are covered with about a quarter of an inch of water. The accumulator is then placed in connection with several others and charged from a dynamo machine for a space of four hundred hours. At the end of this time, the red lead has completely changed its nature, being converted on the positive plate into peroxide of lead and on the negative plate into a spongy metallic state. The accumulator is now fit for use, and can be charged with the quantity of electricity required, and will then give out, after making allowance for the loss in charging from the machine. from eighty to to ninety per cent. of work produced by the machine. The smaller type of accumulator differs only from the larger one in the size and number of its plates. Besides accumulators in wooden cases, several types have been made of a circular form, in which earthenware and glass jars have been used.

IMPROPER CONSTRUCTION.—No fact can be more patent than that every change in construction of a machine, or of shape in a tool, is not necessarily an improvement. Some of our old-style makeshifts are better in use than some recently patented arrangements, and there are contrivances "as old as the hills," which are more enduring in value than the hills. Yet there are builders of tools, who, in order to avoid some patented plan generally acknowledged to be correct, or to pretend ignorance of well-known mechanical contrivances, insist on sending out imperfect imitations of good devices, or of claimed improvements on well known attachments. There are machine tools sent out to-day from manufactories ostensibly devoted to the production of good shop tools, and the results of exact work that will not pass the criticism of earnest, honest, competent mechanics, and are a source of continual vexation to the operator, and of frequent expense to the proprietor. Such a state of affairs furnishes a poor text for a lecture on the superiority of New England tools. The world does not stand waiting to see what these mechanical abortionists can produce; the active world wants good work produced by sensible men, guided by practical knowledge, and informed by the needs of the time that demand exactness in production as well as facility in method.

BRITISH AND AMERICAN SHIPS.—The *American Ship* calls attention to the fact that an American ship has to pay $61.33 for consular fees where a British ship would pay but $10.44, and this is only one of the charges with which our ocean marine is crushed. An American ship also has to pay $18 of taxation to every $1 paid by an English ship doing the same line of business.

INDUSTRIAL SCIENCE.

The Mysteries of Metals.

Notwithstanding the wonderful progress that has been made during the last half century in regard to the constitution and working of the useful metals, there is yet a vast deal to be learned. The metals when pure are commonly supposed to be simple elements, yet there are some reasons for supposing that it may yet be proven that at least some of them are compounds. Even the great Faraday gave utterance to the thought that the dreams of the alchemists might yet be realized—that gold and other metals might be found to be compounds and that means might be devised whereby those compounds might be separated, and afterwards so differently re-united that the baser metals might be converted into precious.

The changes which are wrought in iron and steel by converting, annealing and hardening processes are far from being understood by the most advanced metallurgists of the present day. The mysteries of hydrogen gas and its intimate relations with iron are as much a puzzle as they were fifty years ago, and the theory advanced by Graham that hydrogen itself is a metal is still maintained by many chemists. It is only a few years since that absolutely pure iron became known to scientists; and it is now shown to be a metal almost as "unstable as water," and still found in the laboratory as a great curiosity. What had previously been known as pure iron was shown by Jacobi to be a compound of iron and hydrogen. He first separated the two so-called elements. During the process the iron increased in volume, changed from a dark to a silver white substance, very ductile, and so soft as to be nearly as readily cut as lead. The experiment proved that hydrogen played an important part in hardening and tempering steel—as much so as carbon—but how or why none know to this day.

It is found that much more difficulty is experienced in rolling, and otherwise manipulating, gold in a factory where much electricity is generated by the action of the machinery than in a room where no machinery is in operation and where, consequently, frictional electricity is absent. The trouble is manifested in a disposition of the edges of the plates of thin bars to crack. Many other peculiarities, already known, might be mentioned, and there is no doubt that closer observation will still largely increase the number of curious and as yet inexplicable phenomena connected with the working and general characteristics of the metals, both useful and precious.

Machinery Belts.

Fast belt speeds are better than slow ones for many reasons. One is, they are less liable to slip, and the grip is much better. Fixed pulleys should have a convexity of about one-tenth their breadth, or less. This keeps the belt in place while the machine is in proper action. One advantage of belt transmission is that connections may be very readily established or broken at any distance or under any circumstances. Cast-iron pulleys give less belt grip than wooden ones, or than the same covered with a lagging of paper or leather. A perfect belt should be perfectly straight and of even thickness throughout, with but one laced joint, the rest being scarfed together permanently. The ends that are laced together should be cut off square, and the lace holes made by an oval punch, the longest diameter of the hole lenfthwise with the belt. The lacing should be strong and regular, put in evenly, and all the crossings on the outside. Rivet heads should be on inside and washers outside, and the heads should be let in flush with the face of belt.

Horizontal belts drive better than inclined, and still better than vertical, and long ones drive better than short ones. Loose belts last longer than tight ones. Tighteners should be used as little as possible, but if they are necessary they should be large and free running, and applied to the slack side of the belt.

For moist situations leather belts, if used at all, should be of the finest and firmest leather that can be had. You may have a very good belt and a very poor pulley, and be losing power from that reason. The best leather belts are oak-tanned. There is some belting in the market which is chemical-tanned, but colored in imitation of oak.

Coned pulleys, if made for crossed belts, should have all the steps alike. and in this case the belts will run on equal tension and not bear on steps; but an open belt requires steps especially laid down. The proper construction of such cones or steps cannot be shown here without a diagram.

As far as possible, in laying out the belting for a mill, the pulleys should be so arranged that the strees of one belt upon the journals may be counteracted by another in the opposite direction. Belts are superior to gears for the transmission of power in all cases where the power is irregular. Belts have the disadvantage of needing more frequent repairs than gears, and of having to be renewed much more frequently. They should not be too strong. They should be strong enough to carry all the power that is required of them, but weak enough to break before the shaft or pulleys. Wood-working machinery belts generally have less driving power than others where they can remain soft and pliable, as the fine wood dust chokes up their pores and lessens their pliability.

In nearly every case we find circular saws driven by belts which are too narrow, or with pulleys which are of too small diameter. In consequence, we find that the bearings become heated by the excessive sudden strain upon them. No circular saw (except, perhaps, a cross-cut) should be driven by a belt which is in width less than one-third of the saw dameter, and the pulley should be of the same diameter as the belt. The wider a pulley is the less the amount of crown per inch of width there should be. Generally belts running from a large to a small pulley slip on the large one. Belts made from young hides are better than those made from hides of old animals. Good hides may be spoiled in the currying. Leather belts weigh when new about 60 pounds per cubic foot. After that they get a very little heavier. Where narrow belts are used on small pulleys, the shafts should be about 15 feet apart. For larger belts larger pulleys, 20 to 25 feet will do. Where there are very large pulleys, 25 to 30 feet will answer. If the distance between the shafts be too small, there will not be enough sag to the belt to make it tight; and if they be too far apart, there will be too much tension upon the belt and too much pressure upon the bearings.—[Robert Grimshaw.

PRACTICAL MECHANICS.

How to Manage the Steam.

GETTING UP STEAM.—Warm the boiler gradually. Do not get up steam from cold water in less than six hours. If possible light the fires over night. Nothing turns a new boiler into an old one sooner than getting up steam too quickly. It hogs the furnace tubes, leads to grooving, strains the end plates, and sometimes rips the rim seams of rivets at the bottom of the shell.

FIRING.—Fire regularly. After firing, open the ventilating grid in the door for a minute or so. Keep the bars covered right up to the bridge. Keep as thick a fire as the quality of the coal will allow. Do not rouse the fire with a rake. Should the coal cake together, run a slicer in on the top of the bars, and gently break up the burning mass. It has been found by repeated trials that under ordinary conditions no smoke need be made.

FEED WATER SUPPLY.—Set the feed valve so as to give a constant supply and keep the water up to the height indicated by the water level pointer. There is no economy in keeping a great depth of water over the furnace crowns; while the steam space is reduced thereby, and the boiler rendered more difficult to prime. Nor is there any economy in keeping a very little water over the furnace crowns, while the furnaces are thereby rendered more liable to be laid bare.

GLASS WATER GAUGES AND FLOATS.—Blow through the test tap at the bottom of the gauge hourly, as well as through the tap in the bottom neck, and the tap in the top neck twice daily. These taps should be blown through more frequently when the water is sedimentary, and whenever the movement of the water in the glass is at all sluggish. Should either of the thoroughfares become choked, clean them out with a wire. Work the floats up and down by hand three or four times a day to see that they are quite free. Always test the glass water gauges and the floats thoroughly the first thing in the morning before firing up. It does not follow that there is plenty of water in the boilers because there is plenty of water in the gauge glass. The passages may be choked. Also empty gauge glasses are sometimes mistaken for full ones, and explosions have resulted therefrom. Hence the importance of blowing through the test taps frequently.

BLOWING-OUT TAPS AND SCUM-TAPS.—Open the blow-out tap in the morning before the engine is started, and at dinner time when it is at rest. Open the scum-tap when the engine is running before breakfast, before dinner, and after dinner. If the water be sedimentary, run down half an inch of water at each blowing. If not sedimentary, merely turn the taps round. See that the water is at the height indicated by the water level pointer at the time of opening the scum-tap. Do not neglect blowing out for a single day, even though anti-incrustation compositions are put into the boiler. Water should be blown from the bottom of the boiler when steam is not being drawn off, so that the water may be at rest and the sediment have an opportunity of settling. Water should be blown from the surface when steam is being drawn off, so that the water may be in ebullition and the scum floating on the top. If the water be below the pointer, the scum-tap will blow steam; if above the pointer, the scummer will miss the scum.

SAFETY VALVES.—Lift each safety valve by hand in the morning before setting to work, to see that it is free. If there is a low water safety valve, test it occasionally by lowering the water to see that the valve begins to blow at the right point. When the boiler is laid off, examine the float and lever and see that they are free, and that they give the valve the full rise. If safety valves are allowed to go to sleep they may get set fast.

EMPTYING THE BOILER.—Do not empty the boiler under steam pressure, but cool it down with the water in; then open the blow-out tap, and let the water pour out. To quicken the cooling, the damper may be left open and the steam blown off through the safety values. Do not on any account dash cold water on any of the plates. But, in cases of emergency, pour cold water in before the hot water is let out, and mix the two together so as to cool the boiler down gradually and generally, and not suddenly and locally. If a boiler is blown off under steam pressure, the plates and brickwork are left hot. The hot plates harden the scale, and the hot brickwork hurts the boiler. Cold water dashed on to hot plates will cause severe straining by local contraction, sometimes sufficient to fracture the seams.

CLEANING OUT THE BOILER.—Clean out the boiler at least every two months, and oftener if the water be sedimentary. Remove all the scale and sediment as well as the fine dust and soot. Pass through the flues and see not only that all the soot and fine dust has been removed, but the plates have been well brushed. Also, see whether the flues are damp or dry, and, if damp, find out the cause. Further, see that the thoroughfares in the glass water gauges and in the blow-out elbow pipe, as well as the thoroughfares and the performances in the internal feed dispersion pipe and the scum pipe are free. Take the feed pipe and scum troughs out of the boiler if necessary to clean them thoroughly. Take the taps and feed valve to pieces, examine, clean and grease them, and if necessary grind them with a little fine sand. Examine the fusible plugs. Do not put any blocks under the pipes in the hearth pit. Putting blocks under the pipes in the hearth pit robs them of their spring, strains them, and sometimes breaks them.

Manufacture of Iron and Steel Wire in Germany.

ONE of the few manufactures in which Germany can beat its competitors is the rolling of iron and steel wire, and consequently this trade forms an exception to the general depression existing in that country, and is brisk and increasing. There are in Germany 37 wire mills, producing each 500 tons per month, or in the aggregate about 220,000 tons annually. Most of these works have taken to rolling mild steel wire, as the production of bars or blooms by the Bessemer process is undoubtedly less costly than that of the high-class puddled iron bars required for wire-rolling, besides which the homogeneousuess of the metal and the practicability of making blooms of any desired softness or percentage of carbon is an additional advantage, and a better price can be obtained for steel. In the latest built mill the time from the insertion of the bar into the first groove to its leaving the last rolls is about half a minute, and the speed of rolling is such that when the end of the wire leaves the last rolls the next wire is just arriving before them. The furnace is charged with about a ton of billets at a time, and 11 charges are made in 12 hours. The rolling down of a charge takes 25 to 30 minutes, the remainder of the time being required for heating. The difficulty here is to regulate the heating process, so as to get the bars out as soon as they have arrived at a welding heat to prevent waste by burning. It would be best to remove them all within five minutes, but as this cannot be done the furnace heat has to be regulated by dampers and filling up by cold bars in order not to have too much waste.

The roughing or breaking-down rolls are placed in the same train with the rest, arranged in tiers three high, and contain grooves for six passes forward and backward. The first section is a pointed oval, the second diamond, the third oval, the fourth diamond, the fifth oval, and the sixth again diamond. The square rod is taken from the roughing rolls to the second rolls with oval grooves in the second housings; the third housings contain rolls with diamond grooves. The rod is passed twice through the second and third rolls, viz., forward through the second, then back through the third, forward again through the second, and back again through the third rolls. The wire then passes once through each of the remaining four pairs of rolls, the sections alternating between diamonds and ovals, while the last rolls contain the round finishing grooves. The reduction in the oval grooves is about 40 per cent., or the oval section has about 0.6, the area of the preceding square section, while the diminution in the diamond grooves is about 20 per cent. The turn-out

of these rolls was 4,585 tons of wire in 1879, for which 5,200 tons of puddled bars were worked up.

In the arrangement described above, the breaking-down rolls are placed in line with the others and driven at the same speed, which has the advantage of finishing the wire off quicker and hotter, and obtaining a softer wire for drawing purposes. This, however, is not the usual practice, most mills having the breaking rolls separate and driven direct from the crank-shaft, while the high speed wire rolls are driven by means of a spur-fly or by belts, and lately also by hemp ropes, which are said to answer very well. This arrangement is adopted in order to be able to roll heavier bars, and thus to obtain heavier coils, or a greater length of wire without a joint. Instead of six wire rolls there are sometimes eight, the wire being passed only once through each pair. This requires two additional men, but, on the other hand, enables them to work quicker and prevent mistakes, each man having only one groove to attend to.

Asbestos Manufacturing.

The manufacture of asbestos is yet in its infancy in the United States, and there are only two concerns engaged in it in the country, one at Charlestown, Mass., and one in New York. The only other manufacturers of the article in the world are in England. The asbestos is manufactured into roofing and flooring felt, mill board, wick and steam packing, and the New York concern also works it into liquid paints. The flooring felt is flexible, and made in rolls from 1-32 to 1-4 of an inch thick, and the demand for it is growing, for use under the clap-boards, as well as between floors. The mill board is made in still sheets of about the same thickness as the flooring felt. It is used in stove linings and in steam gaskets. The steam packing is made from the size of the finest yarn to 2 inches in diameter.

The demand for all articles manufactured of asbestos is increasing rapidly, as the merits of the article are becoming better known. The Charlestown concern is now running at its full capacity, and is producing about one ton of all descriptions per day. This is almost one-fourth more than its capacity last year. Constant experiments are being made, and, within the last six months, a finer yarn has been manufactured than was ever before made in the modern times. This yarn is finer than ordinary twine, and is used as wick packing. In the last six month the production has increased to a greater extent than ever before. It is expected that before the year is over, large strides will be made in the manufacture, and the list of uses to which it is put will be largely increased. One of these uses is the insulation of telegraph and telephone wires, though the yarn for this purpose has not yet been made fine enough.

All the various processes of manufacture, and the uses to which the article is put are patented, and a patent is also obtained when possible for any prospective use to which it may be put. The machinery used in the manufacture, and all improvements made upon it, and inventions of new machines are also patented. No one is allowed in the works, and the manufacture of asbestos is as jealously guarded as was the making of iron in England 100 years ago. Nearly all of the employes are girls. About ten years ago when the manufacture of abestos was begun by the Charlestown concern, all the stock used was Italian, but for three years back, Canadian asbestos has been the only kind used, and the English use it as well as the Americans. It is much stronger, and its fibre is cleaner and more reliable than the Italian. Asbestos is found in nearly every part of this country, but the American variety is generally worthless, and the article grows better as we go northward. The Canadian mines are located north of the St. Lawrence, and the asbestos is found imbedded in rock, much the same as isinglass, and has to be blasted out. The raw stock is imported free, but the manufactured asbestos has to pay a duty of 10 per cent. The demand for manufactured asbestos is confined to the United States, Canada, England and France, and this country uses the largest amount. The other European countries are, however, beginning to use it. But with all the improvements made in the manufacture during the last few years, we are still behind the Romans and Egyptians, who used asbestos cloth to robe the bodies of the dead in, and also made it into napkins, while the asbestos of the present day cannot, or is not yet made fine enough for this purpose. —[Boston Com. Bulletin.

INCREASE IN PRODUCTION OF OIL.—The opening of new and wonderfully productive oil wells in Pennsylvania will hardly seem an unmixed blessing to some holders. The new wells are in Warren Co., on the northern border of the State. Two of them are yielding 1,000 barrels daily, and now another is reported to be discharging 2,400 barrels per day. In April the average daily product was 80,093 barrels, so that an addition of only 5 or 6 per cent. would not cause much disturbance if the yield had not previously been far in excess of present consumption. At the beginning of 1879 —about three years ago—the stock of oil on hand in the producing regions was 4,615,299 barrels; in January, 1880, it was 8,800,000 barrels; in January, 1881, it was 20,100,000 barrels; at the beginning of this year it was 26,000,000 barrels; and at the end of April it was 28,547,481 barrels. This vast accumulation has occurred in spite of a wonderful increase in consumption, especially in foreign lands.

TECHNICAL EDUCATION.—As wealth increases there will be a growing demand for new artistic productions, and of a class where excellence will be the controlling question, as far as price and fashion are concerned. For this reason no pains should be spared in providing technical schools in every section of our country, so as to popularize the study of a most useful and necessary science—for such it really is—and which is, at the same time, both practical and useful. Technical schools undoubtedly develop a fondness for the manipulation of the various raw materials coming under the attention of the children, and this must lead to a feeling of content among those who finally, from choice, choose to earn a livelihood by working in the factory or the forge. The question of fixity of labor, combined with educated skill in the use of materials, is one of great interest to American manufacturers. In England the development of this system of education has been rapid of late, and at the present time a commission, appointed by the government, is considering the whole question. It is undoubtedly very important, and the report of this able commission will, it is believed, contain much valuable data. Anything that tends to raise the standard of manufactures at this time has a special value, for the reason that the best products command the best prices, and to secure fine manufactures it is necessary to have skilled operatives of the best class.

A NEW SILVERING PROCESS FOR IRON AND STEEL.—De Villiers has invented a patent alloy for silvering. It consists of 80 parts of tin, 18 parts of lead, and 2 parts of silver, or 90 parts of tin, 9 parts of lead and 1 part of silver. The tin is melted first, and when the bath is of a brilliant white the lead is added in grains, and the mixture stirred with a stick of pine wood, the partially melted siver is added, and the mixture stirred again. The fire is then increased for a little while, until the surface of the bath assumes a light yellow color, when it is thoroughly stirred up and the alloy cast in bars. Whenever there is a choice between iron and steel, in making any article, the best quality of steel is to be preferred. The operation is then carried out in the following manner: The article, a knife-blade for example, is dipped in a solution of hydrochloric or sulphuric acid, from 1 to 10 parts of acid in 100 parts of water. After taking it out of this pickle it is immediately rinsed with clean water, then dried and rubbed with a piece of soft leather or dry sponge, and finally exposed to a heat of 70 or 80 deg. C. (158 to 176 deg. Fahr.), for five minutes in a muffle. The object of this is to prepare the iron or steel to receive the alloy, by making the surface porous or covered with small microscopic holes. If the iron is not very good these holes are much larger, and frequently flaws and bad places are disclosed, which make the silvering more difficult. With steel the process goes on very regularly. The article is warmed to 122 or 140 deg. Fahr., and dipped in the bath of the above described alloy, which is melted by a gentle fire of graphite or refractory clay. The bath must be perfectly fluid, and is stirred with a stick of pine or poplar; the surface of the bath must have a fine white silver color. Under these circumstances tne object thus prepared quickly takes up the alloy, which penetrates the porous surface. For a knife-blade an immersion of one or two minutes is sufficient to cover it; larger articles require five minutes' immersion. After taking it out of the bath it is dipped in cold water, or treated in such a way as to temper it, if tempering is necessary. If it is left too long in cold water it frequently becomes brittle, but this evil can be avoided by a little experience. It is then only necessary to rub it off dry and polish without heating it. Articles treated in this manner look like silver, and ring like it too, and withstand the oxidizing action of the air. To protect them from the effect of acid liquids like vinegar, they are dipped in a bath of amalgam, composed of 60 parts mercury, 39 parts of tin, and 1 part of silver. It is then dipped warm into melted silver, or electro-plated with silver to give it the silvery look. The method of polishing will depend on the shape of the object. This kind of silvering is said to be very durable, and even resists gentle filing. The cost of the process is comparatively small.

DURING 1881 there were forwarded from the dif ferert stations of the Union Pacific Railway 901,464 pieces of baggages; the collection for extra baggage was $134,347.63; the payments for lost baggage only $119.25, and the number of pieces at all the stations unclaimed was 114.

MISCELLANEOUS RECEIPTS.

TO REMOVE STAINS OF OIL PAINT.—Stains of oil paint may be removed with bi-sulphide of carbon; also by means of spirits of turpentine, and if dry and old, with chloroform. For these last, as well as for tar spots, the best way is to cover them with olive oil or butter; when the paint is softened the whole may be removed by treatment, first, with spirits of turpentine and then with benzine.

PAINTING OF MILLS.—Those who wish to do any painting on or about their mills will find the following an excellent and cheap recipe, which will last much longer than any ordinary whitewash: 300 parts washed and sifted white sand, 40 parts precipitated chalk, 50 parts of resin and 4 parts of linseed oil are mixed and boiled in an iron kettle, and then one part of oxide of copper and one part of sulphuric acid are added. This mass is applied with an ordinary paint brush while warm. If it is too thick, it is diluted with linseed oil. This paint dries very rapidly and gets very hard, but protects the wood excellently.

FIRE-PROOF ROOF.—A German paper says that a roof can be made fire-proof by covering it with a mixture of lime, salt and wood ashes, adding a little lamp-black to give a dark color. This not only guards against fire, it is claimed, but also in a measure prevents decay.

TO PREVENT GLUE FROM CRACKING.—The cracking of glue, which frequently occurs when glued objects become very dry or are subjected to heat of a stove, it is said may be prevented by the addition of chloride of calcium to the glue, which prevents its drying so completely as to become brittle. Glue thus treated will adhere to glass, metals, etc., and can be employed for affixing lables to bottles.

COPPER PLATE LINE ENGRAVING.—The copper plate ready to be engraved is covered with a layer of bitumen, and exposed to the light under the drawing which has to be reproduced. It is then developed with spirits of turpentine, as by the ordinary method. When it is completely developed the lines of the drawing appear, the copper not being covered by bitumen in those places. If a cotton rag saturated with a platinum solution is passed over the plate the lines of the drawing will become black, the other parts being protected by the bitumen. The bitumen, which covers the plate, is then removed by means of benzine, and the design appears in black lines on the copper. This method is only adapted for line drawings, and it can only be applied for ornamenting metallic surfaces. Bitumen purified by Husnik's process, in solution is very convenient.

FRENCH POLISHING.—Dissolve shellac in spirits of wine, with the aid of heat, till it is about as thick as cream. Make a ball of cotton wool, with a bit of soft rag over it. On this pour a few drops of polish; cover with another bit of soft linen rag, on which put one drop of raw linseed oil, hold this against the work as it revolves in the lathe until dry, moving it to and fro all the time; repeat the process till the work shows a polish; then, with a rag on which is just a drop or two of spirits of wine, or with the same rubber, on which is a drop or two of spirits, go over it again till it is all bright, with no smears. If not lathe work, you will have to rub round and round in circles over the surface, never stopping, but taking up the rubber *en route* generally; the best way is with the last circling motion, to sweep it clear of the work. It is a laborious job if on a large surface, especially as the polish will at first sink in; if you inspect it you will find it terribly fallen off from its pristine beauty. You should let it then dry hard and with the very finest No. 00 sandpaper, rub it down to a general smooth, but, of course, wholly unpolished face. Then go at it again. Do not use much oil, only enough to prevent the rag sticking in its course.

A SHIP railway to extend across the Isthmus of Chinecto between the Straits of Northumberland and the Bay of Fundy, is to be built by the Maine Transportation Company, which will receive a subsidy from the Dominion of $150,000 per year for twenty-five years. The road will be adapted for the transfer of vessels of 2000 to 6000 tons, will be eighteen miles long, the cost when completed being $4,500,000. It will save 500 miles between Montreal, Quebec and St. John, and 400 miles between Boston and Montreal.

RAILROADS AND TRAFFIC.

IT is estimated that the contemplated Western connections of the Lehigh Valley and Philadelphia and Reading railroads will give those companies additional distribution for about two million tons of anthracite coal.

IT is estimated that there are $3,000,000 invested in the Pennsylvania railroad shops at Altoona. When in full operation they employ 3,500 men, and the pay-roll reaches $170,000 per month.

ARRANGEMENTS have been completed within the past few days by which the Pittsburgh & Western Railroad has secured important connections. The narrow gauge portion of this road will by September 1st, next, traverse the Northwestern part of the State and into New York as far as Utica, traversing the oil regions for 200 miles.

IN May fifty railroads earned $20,824,492, against $18,521,382 for May, 1881. From January 1 to May 31, 1882, 46 roads earned $95,190,817, against $79,202,470 for the corresponding period last year.

THE gross earnings of the Cleveland, Akron & Columbus in May amounted to $43,255 as against $34,992 in May, 1881, a gain of nearly 24 per cent; mileage 144 both years.

OFFICERS of the Pennsylvania Railroad Company estimate that the subscriptions for the stock lately alloted by the board of directors will aggregate nearly $600,000. A large amount of subscriptions from London, and other demands for shares from stockholders living at a distance are coming in. The amount of the extra issue authorized is about $6,240,000.

A CERTAIN English railway porter, was once sorely puzzled by a tortoise which his owner wished to send by train. The official was nonplussed by the inquiry as to which head of the tariff the creature should be considered to fall under; but, at last, deciding that it was neither "a dog" nor "a parrot"—the broad zoological classification in use on railways—pronounced the tortoise to be an "insect" and therefore not liable to charge. This profound decision was prefaced by a brief enumeration of the animals which the railway company called "dogs." Cats is dogs and rabbits is dogs, and so is guinea pigs, said the porter, but squirrels in cages is parrots.

UNDER the head of "Added Vicissitudes of Travel," the Laramie Boomerang prints the following: We learn with a good deal of regret that one of our favorite roads will adopt several hundred miles of barbed wire fence along its line this summer. The grief and humiliation of being fired from a moving train for non payment of dues is greatly aggravated by fetching up with a dull thud on the top wire of a fence that has sharp protuberances on it.

THE gross earnings of the Cincinnatti Indianapolis, St. Louis & Chicago, for the year ending June 30, 1882, were $2,520,323.06; expenses $1,473,-394.19; net earnings, $1,046,928.87; interest, taxes and rental, $631,599.35; leaving net profits, $415,-329.52; dividend, $360,000; surplus, $55,329.52, to be carried to profit and loss account. Upon this statement the stockholders have received 1½ per cent. dividend. The earnings show a large increase over those of last year, both gross and net. The stockholders have ratified the action of the directors increasing the capital stock $1,000,000, the money to be used in building the Cincinnati depot and elevator and in the purchase of new equipments.

FROM June 20th last the passenger rates from Chicago to Kansas City have been $12.60, from Chicago to St Louis $7.50 and from St Louis to Kansas City $7.50.

THE Toledo, Cincinnati & St Louis (N. G.) railway company has contracted for 68 engines and 680 box cars, to be delivered 100 each week, and has received and paid for twenty-eight passenger coaches, built by the Pullman's company. This will give the company a car equipment of 2,650 pieces. Negotations are going on for 250 coal cars.

THE Toledo Belt Railway Company has been incorporated with a capital of $300,000.

THE Galveston News says the newly discovered petroleum area in Mexico is believed to exceed that of Pennsylvania and Western Virginia.

FACTS
For Machinists, Manufacturers and Others.

THE USES OF HARD WOODS.—The amount of hard woods, or "white woods," as they are called in trade, in contradistinction to the resinous and gums, which are used in one form or another in the mechanical arts, in agriculture, and domestic life, is simply astounding to one who has never considered the matter. You have only to think how many handles of one sort and another—axe, pick, spade, plow, hatchet, hammer, etc,—are used on every farm, and apply that scale to the agricultural proprietors of the world, to see the amount of these woods that are in constant demand. Consider the number of sledge and hammer handles that must be worn out in making cars, boilers, and engines, of the pick handles that must be had to build railroads, grade and build streets, dig tunnels, sink shafts, mine iron and coal, gold and silver, and some idea of the vastness of the demand for even handles alone may be had. Cogs, pulleys and mallets, spokes and hubs, shuttles and bobbins, and a thousand specific devices for saving time and labor, must be made out of these woods. There are innumerable vehicles to be supplied with spokes and hubs, rims and felloes, shafts, axles, spring bars, coupling-poles and other essential parts. There is no present likelihood of there being any substitute found for such woods in these uses. There will never be a metallic handle for the axe or pick of practical utility. The elasticity and lightness of wood are essential in all these uses. In others still other qualities, as lack of friction or imperfect conduction, are necessary. Shuttles must be made of a closely knit wood which may be worked very thin, yet remain firm and light, and take a very high polish. Mallets, as for the use of stone-cutters, must be made of a heavy, close-grained, elastic wood, which will not splinter nor become indented from a long succession of hard blows upon the chisel head. There are but few kinds of wood which are adapted to any of these uses. Foremost among them all, as the great mechanical wood, is the hickory. Its whiteness, hardness, toughness, elasticity and durability, together with its capacity to assume a reasonable finish, and almost absolute freedom from splinters or checks, give it easily the supremacy over all other hard woods. It is true, that in some of the uses to which these woods are devoted, the hickory is not as good as some others. It would not make as good a shuttle as the persimmon, as good a plane-stock as the apple, as good an engraving material, or as fine rings or croquet balls as the box or dogwood; but while these woods excel it in these peculiar uses, they are useless in a thousand others where hickory is unapproachable. As a material for all classes of handles, light spokes, rims and shafts—in short, whenever both stiffness and lateral elasticity are required together, it is without a rival. It is among woods what steel is among metals. Two kinds of oak, the white and post, are sometimes used for the grosser purposes in which the qualities of hickory are required, as large spokes, felloes, etc., as well as many other purposes to which it is peculiarly adapted.—*Wood Worker.*

A SMOKELESS FUEL.—It is a fact well known that a semi-coke, resulting from a short distillation of coal, furnishes a fuel that is practically smokeless. It is now claimed that by treating this coke with water when hot, it is rendered still more smokeless, a fuel in every respect peculiarly advantageous, having all the cheerfulness and heat-giving properties of the unprepared coal, with none of the drawbacks or objections arising from its use. To produce this fuel in sufficient quantities for general use, it is believed that the existing plant of gas companies would suffice, that is, instead of taking 10,000 cubic feet of gas per ton from the coal, there might be substituted one-third of that amount, or any other convenient proportion, passing three times the quantity through the retorts. In this manner the gas would be coming away from the retorts all the day long, just as usual, with a slight loss of time only for the additional frequentcy of charging. The supply at the end of twenty-four hours would be in excess of that obtained from the long extraction, and thus less plant would be necessary to give the same quantity in a given time.

WROUGHT IRON AND STEEL BARS.—Re-heating and rolling down or forging down wrought iron bars reduces their elongation and increases their tensile strength. The skin of wrought iron is not the strongest portion. Cold rolling increases the strength of wrought iron. Tensile strength of wrought iron averages ten per cent. more with the fiber than across it. Compressing melted steel with a pressure of about six tons per square inch increases its strength.

THE USE OF ALLOYS.—The opinion seems to be rapidly gaining ground among metallurgists that, wherever mechanical strength is desirable, an alloy is preferable to pure metal. One of the greatest obstructions to the mechanical value of iron in its tendency to crystallize may be prevented by the admixture of other metals. In almost every direction nature has placed certain metallic masses, to which the name meteoric iron has been given, on the supposition that these matters have fallen from the atmosphere, the composition of this substance, wherever found, being chiefly of iron and nickel, the latter varying from two to ten per cent., with small quantities of cobalt, and, it is said, chromium. Science has made artificial meteoric iron, and tests show its qualities to be identical with those of the native compound. But in addition to this it is more ductile and has more tenacity than pure iron. A mixture of ninety-eight parts pure iron and two nickel has all of the peculiarities of the best meteoric iron.

GLASS MANUFACTURERS.—The glass manufacturers are going to stop production during the summer. A few of the window glass making concerns will stop before the 1st of July to suit their individual convenience, but on that date there will be a general suspension of manufacture for two months. This, the manufacturers claim is not at all to diminish supply and keep up demand, but is for the reason that the business cannot be carried on at a profit during the heat of summer. It is also necessary to have some time to make repairs, to set new pots, and clean out stacks.

IMPORTED IRON SHEETS.—According to the London Engineer, there is a new local demand about Wolverhampton for iron sheets intended for export to the United States. The Anglo-American Company, which is making roofing shingles in Wolverhampton, has now introduced into that town machinery for cutting out sheets into shapes suitable for use in the making of coal vases, pans and stove shovels. Thus outlined, the sheets have not to pay the duty on the other side which would be carried by the scrap inseparable from the cutting up of a sheet as it leaves the mill, while from the scrap the ears of the pails are shaped and the holes punched at the same operation.

THE cry that is constantly going up on the part of certain journals says an exchange, that railways in Mexico are sure sinking funds, and can never pay, is partly answered by the publication of the receipts and expenditures of the road from the City of Mexico to Vera Cruz with branch to Puebla, and in all 239 miles in length. The road has been in practical operation since 1873, and the net profits of the nine years foot up over $12,700,000, exclusive of Government subsidies, which are not given. In 1880 the profit amounted to $2,147,589, which increased in 1881 to $2,958,730. This looks as though railroading in Mexico did pay after all.

FRANCE is elated over the prospect of a new industry, that of the manufacture of wine from the red beet. The root furnishes alcohol of the finest quality, and it is believed that under grape treatment of the pulp and careful fermentation a fine wine could be produced. Such as has been experimentally procured, has shown fine flavor and body, and scientists are making more thorough experiments. As the beet can be grown in any soil or any climate, should expectations be confirmed, national enrichment is anticipated from the new industry. In such an event, however, Germany and the United States would doubtless also enter into it.

THE total weight of the postal matter carried in the United States last year was 87,169 tons, or 164,338,000 pounds, 16 per cent of which, or 26,294,080 pounds, was sealed correspondence—more than a billion letters.

ITEMS OF INTEREST.

IF a galvanic current pass through any conductor it evolves heat.

INTENSITY of color in flowers of the same species increases with the altitude.

THE Standard Oil Company has offered $8,000,000 for the Navy Yard at Brooklyn, N. Y.

TO COMPUTE the horse power of a boiler get the total number of square feet of heating surface, divide by 12=H.P.

THE largest and oldest chain bridge in the world is said to be that of Kingtung, in China, where it forms a perfect road from the top of one mountain to another.

THE gross receipts of the American Patent Office for the year 1881 were $853,565.89; the gross expenditure was $605,173.28, leaving a net profit of $248,492.61.

THE Akron officials having inspected Cleveland's mast lights are so satisfied of their effectiveness that they have determined to complete their system.

FLOUR, that most sensitive of articles, was highest in 1817, owing to the cold summer of the previous year throughout this country and Europe. It commanded $13 per barrel.

PORK was highest in 1865 and lowest in 1879. To supply the domestic and foreign market for this article fifteen millions of hogs are annually slaughtered in the United States.

THE Mexicans are beginning the manufacture of cordage on American machines, and a Boston firm is completing an order, part of which they have already shipped, for 20 spinning jennys and 1 rope machine for a factory in the province of Yucatan whence Sisal hemp is imported.

GOVERNOR Foster, General Cal Brice and General Sam Thomas are among the principal stockholders in the Postal Telegraph Company which has just been organized with a capital of $21,000,000. It is to be built at once between New York and Chicago, and follow the line of the Nickle Plate Railroad.

A COMPANY has been formed in South Florida to manufacture an active fertilizer from the shell marl, which is found in large quantities on some portions of the upper St. Johns. It is proposed to grind the shell and supply ammonia by adding the decomposed flesh and bones of fish, which can be obtained in large quantities in the lakes of the upper river.

THE largest sale of tobacco that has ever been made in this country, or perhaps in the world, was concluded lately in New York. A representative of the Italian Regie, acting for the Italian government, which has a monopoly of the tobacco business, purchased 12,244 hogsheads of leaf tobacco at the rate of $150 a hogshead, so that the bill amounted to $1,836,600.

A CURIOUS instance of the way in which electric lighting is gaining favor is furnished by its introduction in the Amsterdam gas works, where a 20-horse gas engine is used to run 48 Maxim incandescent lights, distributed in the office of the company, in the room of the manager, engineer, and in some parts of the works. Thirty-cells of the Kabath storage battery are used to supply the lamps.

GREAT PAUL, the new monster bell of St. Paul's cathedral, in London, was successfully rung at the foundry in Loughborough. It was swung at the time on its own headstock, being supported two feet from the ground on temporary timbering. It was lifted by a fifty-ton iron crane and nineteen men were required to ring it properly, though four could make it speak. While shut in by walls and houses, the bell was heard seven miles away.

THE compacted material known as metalline is destined, it is believed, to effect a great revolution in both heavy and light castings. Its moderate strength requires that for heavy work it should be supported by metal; it is introduced in the form of plugs thickly distributed on the bearing surfaces. The U. S. Government has recently ordered this material to be applied to five thousand bearings. It called for two millions of plugs. An improvement is in progress which will allow oil to be used with it.

MINES AND MINING.

A DISCOVERY of a vein of lead ore, carrying twelve dollars of silver and six dollars of gold to the ton, has been found within four miles of Ishpeming, Michigan. Cross-cuttings are likely to develop paying veins in the neighborhood.

DR. LITTLE, State geologist of Georgia, is reported to have said that there is more gold in that State than there is in California, and that the annual production might be increased to ten times what it now is and then be practically inexhaustible. Several new companies with a capital of over $100,000 each are engaged in working or establishing mills, and the annual yield of $1,000,000 for the whole State will in all probability be quadrupled within the next two or three years. A project is now on foot to dredge several of the gold bearing rivers, the sands of which are very rich in gold. A Boston company is at the head of the latter enterprise, and from the capital it represents and the practical business qualities of its members it is safe to say that its success is almost assured and that many of Georgia's rivers will be made in the future to yield her a harvest of riches. In North Carolina, too, the gold fever has seized upon the minds of the people and the mining interests are having a phenomenal growth.

AT last there appears a possibility that the terrible loss of life which annually occurs in England through mining accidents will soon be sensibly reduced. At a meeting of the Iron and Steel Institute, London, Mr. Mosley read a long and instructive paper on a new method of mining coal. The principal feature is that cartridges containing lime in a highly caustic condition are employed instead of explosives. After one of these has been rammed down tightly to the bottom of the shot hole and tamped, water is injected into the cartridge by means of a small force-pump and hose, and a rapid generation of steam then takes place, gradually rending asunder coal in all directions, and in short, performing all the duties of gunpowder or dynamite.

THE Eureka and Richmond silver mines of Eureka, Nev., have contracted with the Southern Pacific railroad to carry about 70,000 tons of lead by rail to the Gulf of Mexico. It will require some 7,000 cars to move this lead, which is the accumulation of several years.

IT is claimed by those expert in the business that mines in New Mexico are much more easily worked than those of Colorado, that the ore is less refractory, assays as rich and in many cases richer, and, most important of all, operations can be carried on all the year round; whereas, from one third to one-half of the year the mining districts of Colorado are buried in snow. The mining camps now attracting the most attention in the territory are White Oaks and Socorro, the latter a station on the Atchison, Topeka & Santa Fe railroad, south of Albuquerque; the former about 160 miles due south from Las Vegas and 100 miles east from Socorro. Rich mines are being worked at both these points, and developments are being rapidly made in other directions.

THE product of the Copper Queen, Arizona, continues at about 13 tons per day. The copper ore increases in richness the lower the workings.

THE Cerillos district, New Mexico, abounding with ancient mines, possesses some of the essential elements of a very successful mining camp, such as an abundance of rich silver and gold ores, inexhaustible coal beds for fuel, quantities of the best of fire clay, and any amount of flux in the shape of iron and galena lead ores, and all this within a radius of five miles.

MARQUETTE Mining Journal: The Lake Superior Iron Company had shipped up to and including the 14th inst., 83,886 gross tons by lake, an increase of 49,985 tons over a corresponding period last year, and surely indicating an aggregate product of 300,000 tons the present year, barring accident or collapse of the market. The Chapin comes next, with 67,423 tons, against only 27,036 tons during the same period last year, while the Champion shows a corresponding gain of 27,096 tons. Indeed, nearly all the mines show a gratifying increase, and should the same ratio be maintained throughout the season, a product of 3,000,000 tons will certainly be reached. The following table shows how much copper was produced in this country in 1881: Michigan, 53,000,000 pounds; Maine, 100,000 pounds; Maryland, 100,000 pounds; Missouri, 200,000 pounds; North Carolina, 2,000,000 pounds; Pennsylvania, 500,000 pounds; Vermont, 2,500,000 pounds; Arizona, 8,000 pounds; Colorado, 1,750,000 pounds; California, 500,000 pounds; Idaho, Utah and Montana, 1,750,000 pounds; New Mexico, 500,000 pounds; Georgia, 50,000 pounds; Nevada, 250,000 pounds; from Canadian pyrites, 500,000 pounds, making a total of 71,700,000 pounds.

REVIEWS.

Damen's Ghost. (Round Robin Series). BOSTON: James R. Osgood & Co. CLEVELAND: Cobb & Andrews.

For entertaining summer reading there are few books that offer greater entertainment than Damen's Ghost. It is lively, quaint, and replete with incident. The issues are such as to develop character in great variety. The spirit with which the *dramatis personæ* are portrayed, the playful humor, the irony, the pleasant and the doleful surprises bespeak an author conversant with society, and ever watchful of the under-current of feeling and purpose beneath conventional forms. The work is one of the best of the Round Robin Series, and will bear reading a dozen times.

The Century Illustrated Monthly Magazine for July. NEW YORK: Union Square:

The number opens with a fine steel portrait of Ralph Waldo Emerson. A most original and instructive compilation, lavishly illustrated, is entitled "Among the Thinkits in Alaska." "The Evolution of the American Yacht" abounds with details in the handling of yachts, offers typical models, and presents some fine sea scenes. "Henry D. Thorean," with portrait, is a clever delineation of a clever man, but whose bent of mind was to be ever in opposition. In "The Horse in Motion," as illustrated by photography, forty-four figures are shown. "The Bee Pastures of California" is concluded. The tale, "A Modern Instance" reaches a point of absorbing interest. Another instalment of Carlyles Diary in Ireland is given. Tales, sketches, poetry, topics of the time, the World's Work, &c., and Bric-a-Brac complete the number.

Blackwood's Magazine for June. American Republication. NEW YORK: Leonard Scott Publishing Co., 41 Barclay street.

The June number of this famous Scottish magazine opens with "The Faiths of the World," a subject of absorbing interest. The story of the Lady Lindores is continued. "False Coin in Poetry" is a series of entertaining critisms. "Baron Fisco at Home" is the account of a man who took the world just as he found it. "The Lights of Maga," discourses of "the heroes" of the "Noctes,"—Wilson, Lockhart & Hogg. An account of an English Quarter Sessions is exceedingly graphic. A prominent article and one certain to draw wide attention is "English Progress under Mr. Gladstone."

St. Nicholas for July. NEW YORK: The Century Co.

When we say that this number is quite equal in stories, sketches and illustrations to previous issues, we accord it the highest praise. The frontispiece is a spirited steel engraving of the Queen of Prussia's ride over a battlefield. "An Early American Rebellion" is finely told. Swords are illustrated with twenty-three pictures. "Inside a Fish Net," "Working by the Day," "A Famous Sea Fight," and "The Extra Train" figure among the contents. This magazine is brimful of entertainment.

Wide-Awake for July 1882. BOSTON: Lothrop & Co.

The July *Wide-Awake* opens with an exquisite picture of child-life and summer-time, called, "The Pipers," set off by a melodious little poem. "The Assistant" is a brilliant story, showing sisterly devotion, womanly energy, and broad generosity. A good short story is "Did Ethel see the Queen?" "How Jared saw the Elephant;" "Their Club and Ours;" "From the Hudson to the Neva;" the comedy "No Questions Asked;" "A Summer Evenings' Entertainment, comprising tableaux, pictures, statuary and pantomimes, are among the topics. A healthful and entertaining "Reading Course" is given." Illustrations abound.

THE seeds containing the richest oils belong to the genus cruciferæ.

MARKETS.

FINANCIAL.

Office of TRADE REVIEW AND WESTERN MACHINIST.

FRIDAY EVENING, June 30.

The money market has ruled easy, the bank rate of discount continuing at 7 to 8 per cent. Money on call is 5 per cent. and 6 on prime collaterals for 4 and 6 months' time. A considerable amount of currency has been shipped to the country. At the same time receipts of currency have been considerable. Eastern exchange has been in good demand, and the market is strong at par@1-20 per cent. premium, buying, and 1 10 premium, selling. Sterling Exchange has ruled strong.

NEW YORK.--Money on call is 3@4 per cent. Sterling Exchange lower; sight drafts, $4.88¼@$4.89; 60-day bills, $4.85½@$4.86¼. The stock market has been somewhat dull. There has been a decline in a large number of leading railway stocks, partly arising from the apprehension entertained as to the serious actual damages which the railways may be forced to pay for losses of merchandise of perishable kinds, and for delays in shipments of all kinds of merchandise. Further, the strength of the Western markets for grain and provisions, and particularly for the long deliveries (at Chicago wheat for all the year rose from $1 01⅛ to $1.03⅞, and corn for all the year from 63¾ to 67@66¾ cents), was not without effect, because it encouraged the idea that to those who should know best the crop prospects are not as brilliant as they recently have been represented.

IRON.

Standard brands of pig iron are firmly held. Consumption continues on a larger scale. The market generally indicates a stronger tendency, and for good soft Irons particularly so, owing to the limited supply and high figure at which imported Scotch is held in this market. We quote Eglinton, $23; Carnbroe and Glengarnock, $24.50@$25; Coltness, $26.50; Gartsherrie and Langloan, $25 50@$26. For steel rails the tone of the market is firm at $47.50@$52 for ordinary sections at mill, according to time of delivery. In iron rails there is nothing doing, and prices are nominal. As to old rails, the market is in buyers' favor. We quote: T's, $26@26.50, and D. H., $27.50@$28. Little business is transpiring in wrought scrap. Prime selected, from yard, is quoted $29.50@$30, and No. 1, to arrive, $27@27.50. Steel crop ends are offered at $24. Prices for plate and tank iron are firm.

CINCINNATI--(Reported by Rogers, Brown & Co.) The pig iron market has remained steady through the week, prices being firmly sustained at the decline. The demand for forge iron is light, but the supply is also very light. In foundry grades a fair business has been done. A slight improvement is noticed in foundry business, and the prevailing feeling is one of satisfaction and hopefulness. The following are our quotations for four months: Hot Blast Foundry—Hanging Rock CC. No 1, $27.00@$28.50; No. 2, $26.00@$27 50; Southern, No. 1, $26.00@@27.00; Strong Coke, No. 1, $24.00@25.0); No. 2, $23.00@$24.00; No. 3, $22.00@23.00; Soft Stone coal No. 1, $23.00@24.00; No. 2, $21.00@$22.50. Forge--Strong, Neutral, No. 1, Mill, $20.50@$22 00; Cold Short, No 1 Mill, $20.00@21.00. Car Wheel and Malleable--Hanging Rock Cold Blast, $33@34; Hanging Rock Warm Blast, $27@29; Southern Car Wheel Iron $34@36; Lake Superior do. $31@33; Lake Superior Malleable, $31@$33.

CINCINNATI—(Reported by E. L. Harper & Co.)—The market is stronger than reported last week. Sales have been good, and the demand is on the increase. Numerous inquiries are received daily, and judging from the very favorable report in regard to crops throughout the country, we predict a very active market. There has already been an advance on Strong Neutral Coke, and American Scotch Irons of 50c to $1 00 per ton. The mills are all at work in this district, some running double turn, and prices are on the advance, and very satisfactory to mill owners.

HARDWARE.

Business is active. The Lock Manufacturers' Association have confirmed existing prices for the fall season; so also the manufacturers of Strap and T Hinges and Wrought Butts. The file manufacturers have followed suit. There is a large demand for nails. The tone of the market is strong, and $3 40, net, for 10d. to 60d. is bottom price for carload lots and upward—in a small way an advance of 10 to 15 cents per keg is asked. Mechanics' tools are in active demand, and a good trade is being done in household ware.

LEAD.

Sales have been effected at $4.70@$4.75. Refined sells at $4.85. St. Louis is firm at 4¾c with hard, and 4½c with soft, and 35c per 100 pounds freight. Manufactures have been subject to no change since our last. We quote: Pipe, 7½c; Sheet, 8c; Tin-lined Pipe, 15c; and Block, 45c; all less 10 per cent. to the trade.

TIN AND TIN PLATES.

Tin has slightly improved. We quote 21⅝c@21¾c for large lines Straits, and 22⅛c for Lamb and Flag. London Cables—Straits Ingot, spot, £95@£95. 10d; futures, £95. 15s@£96. 5s." Tin Plates.—The stock of Coke Tin in consumers' hands is ascertained to be quite limited, and prices of it are strong. In other sorts the market is quiet, and prices are unchanged. We quote, at the close, large lines, ordinary brands, per box: Charcoal Bright, $5.87½@$6.25; ditto Ternes, $5.25@5.30; Coke Tin, $5.25@5.30, and ditto Ternes, $5.12½@5.25. Liverpool cabled yesterday Coke Tin, 16s, and Charcoal 18s.@20s.

SPELTER AND ZINC.

We quote the range of both Domestic and Silesian $5.45@5.62½. The market is decidedly flat and very little transpires. We quote Bertha Refined, 8c, and Bergenport, 9½c. Sheet Zinc--Considerable business is doing at 7½c@7⅝c. The following is cabled to us from London: "Light business during the week, and values have fluctuated in both directions. Ordinary, £17@17. 2s. 6d."

COPPER.

There have been large deliveries of ore from the mining regions at this port the past week. Lake Ingots have commanded 18⅛ to 18¼c. Baltimore rules at 17⅝@17¾. London cables £68 for Chili bars; best selected £73. Manufacturers have made no change in prices. We quote: Bottoms 31c@32c; Braziers, 30c@36c; Circles, 33c@36c; Sheathing, 28c, and Bolt Copper, 30c; Segment Sheets, 33c; Fire-box ditto, 30c.

COAL.

Stocks of dealers are moderate. Shipments by lake continue on a fair scale. Freights are unchanged.

LUMBER.

PLANK, MIXED WIDTHS.

2 inch, 12, 14 and 16 feet, together.

A 1 and 2	$50
A 3	40
B	32
C	21
D	15
E	13

1¼ and 1½ inch.

A 1 and 2	$48
A 3	40
B select	32
C	21
D	15
E	13

BOARDS.

One Inch, mixed widths.

A 1 and 2 uppers	$44
A 3	36
B select	30
C	20
D	15
E	13

STOCK BOARDS.

12 Inches wide.

A 1 and 2	$45
A 3	38
B	32
C	21
D	16

STRIPS.

6 Inches wide.

A 1 and 2	$42
B	35
C	22
D	17
E	13
Norway Fencing Strips	17
Norway Flooring Strips	25

WORKED LUMBER

FLOORING.

Flooring—A 3	$42
B	38
C	24
D	20
Norway Flooring—A 3	28
C	22
D	18
Matched Drop Siding, 6 inches—A 3	42
B	38
C	24
D	20

Beaded Ceiling $2 higher than Flooring.

One half inch Bevel Siding—A 1 and 2	24
A 3	20
B	18
Ash Flooring—A 1 and 2	40

BILL STUFF.

Small, joists, 12, 14 and 16 feet	$15
18 feet and under	$16

Timber, larger than 8x8 special.

Timber, longer than 18 feet, adds about $1 per foot per M. extra.

Cedar Posts, large	30 00
" " medium	25 00
" " small	$15 to 20 00

SHINGLES, LATH AND MILL WORK

Shingles XXX	$4 50
Clear Butts	3 25
Lath	3 00

Surfacing, one side, adds $1.25; two sides $1 50

Matching flooring and drop sidings, $2.50.

Crowl's Patent Iron

Roofing,

For Steep or Flat Roofs.

NO MORE NOISE OR LEAKING.

TIN AND SLATE ALSO FURNISHED.

Agents wanted in every County.

Cambridge Roofing Co.

Cambridge, Ohio. J. E. ANNIS, Sec'

L. P. SMITH. JAMES OLWELL.

SMITH & OLWELL,

General Machinists,

Manufacturers of

STEAM ENGINES.

(STATIONARY AND MARINE,)

and Machinery of all descriptions.

116 Elm Street, Cleveland, O.

☞ Special attention given to Marine Jobbing.

COATES'

"Independent Lock Lever"

HAY AND GRAIN RAKE.

Patented August, 1867, January. 1875, June, 1875, and November, 1876. 60,000 now in use. Light touch of lever and driver's weight dumps it. Best self-dump in market. Twenty steel teeth. No complicated ratchet wheels, friction bands or other horse machinery needed to operate it. A small boy rakes easily twenty acres per day with the Coates' Lock Lever. Send for circulars.

A. W. COATES & CO.

Alliance, Ohio.

JOSEPH M. DOWNING.

UNION TUBE WORKS, NEWCASTLE, PA.

MANUFACTURER OF

LAP WELDED BOILER TUBES

FROM BEST AMERICAN

Charcoal Hammered Iron.

FOR SALE.

One 15-H.P., mounted Threshing Machine.
One 10-H. P. Threshing Machine.
One 8-Horse Power.

Address
NATIONAL MACHINERY CO.
Cor. Bond & Superior Streets, Cleveland, O.

H. King & Son,

CORRY, PA.,

Founders and Machinists,

Manufacturers of

The King

Pat. Portable Boiler & Engine

The only Portable Safety Boiler made.

Unequaled for Economy of Fuel and Repairs.

Also, General Jobbing & Repairs.

The IRWIN & REBER

PATENT

Expanding Water Conductor,

MANUFACTURED BY THE

S. S. S. Conductor Co.

LIMITED,

47 Federal St., Allegheny, Pa.

THE STANDING SEAM allows of an easy and secure fastening, keeping the pipe far enough from the wall to make any overflow from the eave pipe or head, run down the spout, and not the wall; and will open, in case of freezing, so as to prevent bursting, and still remain double-locked and water-tight.

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E. B. Badger & Son, Boston, Mass.; Noyes & Wines, New York; J. S. Thorn, Philadelphia; John G. Hetzell, Baltimore, Md.; R. P. Gormully, Chicago; F. Schmidt & Sons, Milwaukee; Shackelton Bros., Cleveland; Patterson & Hayes, Erie, Pa.; G. H. Peters & Son, Buffalo, N. N.; James Ackroyd, Albany, N. Y.; Witt & Brown, Cincinnati,; Hull & Cozzens' Mnfg Co., St. Louis, Mo., and many others.

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Double Top Vapor Stove

Patented Dec. 13, 1881.

This Stove is acknowledged to be superior to all other Vapor Stoves.

AGENTS WANTED. Send for Illustrated Circular and Price List. Address

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6 Champlain Street, next to Valley RR. Depot,
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BOILER MAKER,

And Sheet Iron Worker.

BRIDGE STREET, SPRINGFIELD, OHIO

Special attention paid to taking out and Piecing Portable Flues.

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Agricultural Implements,

WAGONS, FERTILIZERS, SEEDS, &C.

The Empire Grain and Fertilizer Drill and Twine Binding Harvesters Specialties.

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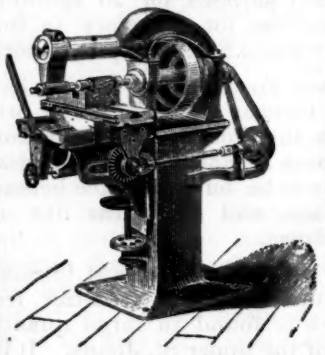
Manufacturers of



Milling Machines, Drill Presses,
Hand Lathes, Tapping Machines, Cutter Grinders and Wood Planers. Milling Cutters, all shapes and sizes. Gear Cutting and Milling in all its branches.
No. 4 Milling Machine.

139-143 Center Street,

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ALLIANCE INDUSTRIAL WORKS,

Manufacturers of

STEAM ENGINES,

and Circular Saw Mills.

Specialty of Portable Saw Mills and High Speed Engines.

ALLIANCE, OHIO.

Smith & Curtiss,

JOBBERS OF

TEAS,

COFFEES AND SPICES

ALSO PROPRIETORS OF THE

CLEVELAND

Coffee and Spice Mills,

107 & 109 Bank Street,

Cleveland, O.

Cleveland Wholesale Prices.

HARDWARE.

Adzes.

Carpenter's.....per doz $18 40
Ship..... " " 18 75
Heavy railroad.... " " 19 50

Axes.

Hunt's.....₱ doz $ 9 50
Lippincott's Crown ₱ doz 9 00
Cut More ₱ doz 9 00
Peck's Double Bit ₱ doz 22 00
" Champion Blade ₱ doz 11 00

Anvils.

Eagle, Amer...per lb. 10c dis 20
Wright's..... 10¾c@11c
Armitage's Mouse Hole 9¾@9¾c
Trenton..... 10¾c
Wilkinson's..... 10¾c

Anvil Vise and Drill.

Millers Falls Co. $28.....dis 20
Cheney Anvil and Vise..dis 25&2

Vises.

Solid Box, list of July 1, '79, dis 35
Solid "Crown" (A. H. Hildick).....40 to 100 lb. 15c net
Solid, Peter Wright's.....15¾
Solid, Wilkinson's.....13¾
Parallel, Parker's.....dis 10
Saw Filers, Hopkins' ₱ doz $17.50, dis 10
Reading.....dis 45&10
Cowell Hand Vises.....dis 20
Richardson's Vise and Anvil.....dis 25

Augurs and Bits. Dis

C S cut augurs.....40&10
do do do bits.....40&10
D C gimlet do Ives....dis 50
Snells bits.....dis 40
Russell Jennings' augers dis 16⅔ &10&10
Cook's pat augur.....40&10

Animal Pokes.

Berea, per doz..... 4 00
Eagle, per doz..... 5 00

Apple Parers.

Domestic & Reading ₱ doz.$7 50
Turn Table..... 6 00

Bolts.

Machine.....dis 60
Bolt ends.....dis 60
Plow.....dis 50
Plow, R. B. & W.....dis 40
Cast Iron Barrel Shutter, etc.....dis 50&10
Cast Iron Chain (Sargent' list).....dis 60&10
Ives' Pat. Door Bolts..dis 50
Wrought Barrel.....dis 55&10
Wrought Square.....dis 55&10
W'g't Shut'r, all iron, Stanley's list.....dis 50&10
Union Carriage.....dis 70
Tire, R. B. & W., new list.....dis 70&10
Stove, American Screw Co.'s.....dis 40

Bellows. Dis

Blacksmith's com new list, 45 ₱ ct
Moulder's new list, dis 25 ₱ cent
Hand, new list, 25 per cent

Butts. Dis

Wrought brass.....65&10
Cast, loose joint.....10&10
Pin, japanned and silver tipped.....45&10
Wrought, fast joint narrow.....40&10
Wrought fast joint broad.....40&10
Wrought loose joint broad.....45&10
Wrought table and back flaps.....40&10
Loose joint, reversible.45&10

Cleveland Stamped Elbows

Genuine Russia Iron

4 inch per doz..... 4 50
4¼ do do..... 5 50
5 do do..... 7 50
5¼ do do..... 8 50
6 do do..... 9 50
7 do do.....11 00

Planished American Russia Iron

4 inch, per doz..... 4 00
4¼ do do..... 5 00
5 do do..... 6 50
5¼ do do..... 7 50
6 do do..... 8 50
7 do do..... 9 50

Charcoal Iron

4 inch, per doz..... 2 00
4¼ do do..... 2 50
5 do do..... 3 50
5¼ do do..... 4 00
6 do do..... 4 50
7 do do..... 5 50
25 per cent

Chisels.

Hot and cold cutting.....₱ lb 30
Railroad track..... 30
Machinists..... 30
Mallet head..... 50
Cape..... 50
Packing..... 50
Stone cutters..... 50

Crowbars.

Cast steel.....₱ lb 8¼
Iron, steel points..... 6¾c

Cutlery, Pocket and Table.

Meriden Cutlery Co., table..net
Am. Miller Bros.' Cutlery Co.....dis 25
Humason & Beckley, pocket 33⅓
Naugatuck Cutlery Co...list net
Aaron Berkenshaw's pocket dis 25

Crucibles.

Per number..... 1@ 4½

Chains.

Coil by cask.....

3-16	¼	5-16	⅜	7-16	½
10¼	9	8	7	6½	6¼

Drills and Drill Stocks.

Blacksmiths', each...$2.50 dis 10
Blacksmiths', self-feeding, each 7.50 dis 20
Breast, P. S. & W.....dis 20&10

Drawing Knives.

Witherby's.....dis 65@10
Nobles Mfgr. Co.....15
Adjustable handle.....20

Emery and Emery Paper.

Regular Numbers.....₱ lb 6c
Flour and F. F.....₱ lb 4c
B. & A. Emery Paper..dis 30&5

Enameled and Tinned Ware.

Kettles.....dis 50
Sauce Pans.....dis 25
Tinned Sauce Pans.....dis 50

Files.

Auburn...$5 to £. dis 35 pr cent
E. M. Boynton's, new list..dis 25
J. & Riley Carr.....4.50 to £.
Johnson & Bro.....dis 30
Butcher's.....4.50 to £.
Walter Spencer & Co.'s "Diamond".....4.50 to £.
Fisher's.....4.75 to £.
Moss & Gamble.....4.50 to £.
H. Disston & Sons (new list).....dis 40 per cent
Heller Bros.' Horse Rasps dis 25
Nicholson.....dis 40
New American.....dis 40
Union File Co.....dis 40

Grindstones.

Ohio.....1¾@1¾ ₱ lb
Nova Scotia.....1¾@1¾ ₱ lb

Hammers.

Maydole's.....dis 15
Cheney's.....dis 25
Hartford Hammer Co.....dis 20
Humason & Beckley.....dis 50
Verree.....dis 5
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50 and $1.75, dis 25&10
Nelson Tool Works....dis 40&10
Warner & Noble's.....dis 5
Kip's.....dis 15
Yerkes & Plumb.....dis 15
Wilkinson's Smiths' 11½c ₱ lb net

Hatchets.

Yerkes & Plumb:--Shingling, Nos.....1, 2, 3,
₱ doz $7 50, $8 00, $8 50, dis 25
Claw, Nos.....1, 2, 3,
₱ doz $8 25, $8 75, $9 25, dis 25
Lathing, Nos.....1, 2, 3,
₱ doz $7 50, $8 00, $8 50, dis 25

Nails.

10 to 60d..... 3 40
8 and 9d..... 25
6 and 7d..... 50
4 and 5d..... 75
3d..... 1 50
2d..... 2 75
3d fine..... 3 00
2d fine..... 3 75
⅝ inch..... 3 00
4d barrel..... 1 00
1¼ inch barrel nails..... 1 50
1½ do do do..... 1 75
1 do do do..... 2 50
⅞ do do do..... 3 00
Cut spikes, all sizes..... 25
Clinch nails, all sizes..... 1 75
Casing and box nails 75 cts advance
Finishing nails, $1 25 do
Tobacco nails, 50 cts do

Nuts and Washers

Nuts, square.....7c off list.
Nuts, hexagon.....7c. off list.
Washers.....6c off list.

Picks.

Railroad, 4 to 5 lbs...doz $7 75
5 to 6 lbs... 7 75
to 7 lbs... 8 50
7 to 8 lbs... 9 50
Railroad Tamping Pick.....
7 to 8 lbs..doz 13 50
Mill Picks per lb..... 75c

Rivets.

Iron.....dis 40
Tinned.....dis 40
Copper.....dis 33⅓

Squares. Dis

Steel or iron, case lots.....50
Try squares and T bevels.....40

Spikes—WROUGHT

All lengths by ¼ inch.....4½c
do do do 5-16.....3½
do do do ⅜, 7-16 & ½ in 3¼

Shovels and Spades.

Ames' new list, July 1, 1881.....dis 15
Old Colony.....dis 15
Remington's (Lowman's Patent).....dis 30
Rowland's.....dis 40 and 10
Griffiths.....dis 40&10

Saw Sets.

Boynton s patent X Cut, per doz $12; Hand Saw, per doz $10.....dis 20
Stillman's Genuine, per doz $3 50 and $5 50.....dis 20
Stillman's Imitation, per doz $3 25.....dis 20&10
Common Lever, per doz $2 dis 30&10
Leach's No. 0 $8; No. 1 $15; dis 15
Hammer, Hotchkiss $5 50, dis 10
" Bemis & Call Co.'s new pattern.....dis 40&5
Bemis & Call Co.'s Lever and Spring Hammer..dis 30&5
Bemis & Call Co.'s Plate..dis 10
" " Cross-cut dis 12½
Aiken's Genuine...$13, dis 50&10
" Imitation.....$7, dis 50
Hart's Patent Lever.....dis 20
Disston's Circular.....dis 40

Sad Irons.

From 4 to 10 lbs....per lb 8¾ net
Self-Heating.....₱ doz $9 net
" Tailors..₱ doz $18 net
Gleason's Shield and Toilet.....dis 25
Mrs. Pott's Irons, double pointed.....dis 35
Mrs. Pott's Irons, square back.....dis 35
Enterprise Star Irons.....dis 40
Combined Fluter and Sad Iron.....₱ doz $15, dis 15

Scales.

Hatch, Counter, No. 171 ₱ doz. $42, dis 37½&10
Union Platform.....$6, dis 45
Fairbanks'.....dis 20
Buffalo Scale Co.....dis 20&5
Forsyth Scale Co.....dis 25
Howe's.....dis 20&10
Chatillon's Eureka.....dis 25
Family Universal.....dis 50
Scale Beams.....dis 33⅓&10

Bag Holders.

Sprengle's Pat, $18.00 per doz 40 per cent. dis.

Planes.

Ohio Tool Co.....dis 25
Sciota.....dis 30
Bailey's Pat. Adjstble..dis 20@25

Rules.

Stanley.....dis 66⅔ and 10

Sash Locks. Discount.

Payson Mnfg. Co. "Perfect"..42
Simmons' Sash Supporters....20

Hinges.

Champion double acting spring hinges.....dis. 30
Screw & Strap 8@12 in.....$6. net
Gravity Locking Blind Hinges, Sargeant & Co. 70&10

Screws. Dis

Flat head iron or steel per cent dis.....30
Flat head brass.....30
Round head iron or steel..25
Round head brass.....20
Brass and Silver capped..40
Japanned, list of Plain Screws.....20
Coach, patent Gimlet point, list per 100.....60
Lag, taper points.....60
Bed.....10
Machine, flat head, iron..55
round head, iron 50
Bench, iron.....55&10
wood, beech, per doz $3.....10
wood, hickory.....20&10

Valves. Dis.

Jenkins' Patent Gate Valves..35
" " Globe " ..40
" Standard Packing " ..20

Wrenches.

Coe's genuine.....40 & 10
Coe's imitation wrought bar..60
Mechanics' 60 and 10

Wire.

Brass and Copper.....dis 20
Bright & annealed, Nos. 0 @ 18 dis 50@52½
" " Nos. 19 @ 26 dis 60
" " Nos. 27 @ 36 dis 65
Coppered.....Nos. 0 @ 18, dis 45
Galvanized, Nos. 0 @ 18, market list,.....dis 40@45
Tinned, Nos. 0 @ 18,....dis 40@45
Cast steel.....dis 40
Tinned Broom Wire, Nos. 18 @ 25.....dis 55
Annealed Fence, Nos. 8 and 9.....dis 55@52½
Annealed Grape, Nos. 10 to 14.....dis 52½
Galvanized Telegraph, Nos. 7 to 9.....₱ lb 7¼c
Galvanized Telegraph, Nos. 10 to 11.....₱ lb 8¼c
Galvanized Telegraph, No 12.....₱ lb 10½c
Fence staples.....₱ lb 5½@5¾c
Fence Staples, galvanized, ₱ lb 7@7¼c
Stubs Steel Wire...$7 00 to £
Barb Wire, painted.....8¼c
Barb Wire, galvanized.....9¼c
Crucible Steel Ropes from ⅜ in. at 9c to 1¼ in. at.....52c
Best Selected Iron Ropes from 3-16 in. at 8c. to 1¼ in. at.....33c

Boiler Plates.

("Gaylord"--Standard Quality.)
C. No. 1.....1 50
C. H. No. 1 Shell.....4 75
C. H. No. 1, 50,000.....5 25
C. H. No. 1, 55,000.....5 75
C. H. No. 1 Flange.....6 50
Firebox.....
T. S., 60,000.....(as per)..6 50
T. S., 65,000.....(act of).....
Homo. Steel, 70,000 (of Cong).7 50
Heads, ¼c ₱ lb extra.
N.B.—Eastern brands of boiler plate at from 2-10 to 3-10c ₱ lb less than above prices.

Sheet and Tank Rivets. "Norway."

All sizes.....dis. 15

Boiler Rivets—"Albany."

½, ⅝, 11-16, and ¾ in. diam.5 50

Boiler Makers' Tools.

Doty's Power Shears....net list
" Hand Lever Shears..net list
" Power Punch.....net list
" Hand Punch.....net list
Steel Screw Punch.....net list
Iron Screw Punch.....net list
Boiler Plate Rolls.....net list
Buffalo Forges & Blowers dis 20
Watson's " " net list
Spring Tube Expander....dis 15
Roller Tube Expander..net list
National Tube Cleaner...dis 20
Wire Flue Brushes.....net list
Anvils—"Peter Wright" 12½ ₱ lb
Solid Box Vises.....net list

Nuts, Bolts, etc.

Square & Hex. Nuts..6¾ off list
Washers.....6¾ off list
Machine Bolts.....dis 60
Bolt Ends.....dis 60
Boiler Patch Bolts.....net list

Boiler Tubes.

"National" Standard Gauge 1 inch to 10 inch.....dis 37½
"National" Standard Gauge 11 inch to 15 inch.....dis 25
"National" Special Locomotive Tubes.....net list

IRON AND STEEL.

Flat Bar.

1½ to 4 by ⅜ to 1 inch..... 2 85
4¼ to 6 by ⅜ to 1 inch..... 3 00
1¾ to 6 by 1⅛ to 1½ inch.... 3 25
1¼ &1¾ by ⅜ to ¾..... 3 00
1 & 1¼ by ⅜ to ¾..... 3 10
⅛ ¼ and ⅜ by ⅜ to ½..... 3 25

Round.

1 to 1⅞ inch..... 2 85
2 to 2⅝..... 3 15
2¾ to 3¼..... 3 45
3⅜ to 4..... 3 50
4¼ to 4½..... 3 45
4¾ to 5..... 4 90

Square.

1 to 1⅞ inch..... 2 85
2 to 2⅝..... 3 10
2¾ to 3¼..... 3 45
3⅜ to 4..... 4 00
¼ to ⅞..... 3 00

Heavy Band.

1⅛ to 6 by ¼ and 5-16 inch. 3 10
1 to 1⅜ by ¼ and 5-16 do 3 15
⅜ to ⅝ by ¼ and 5-16 do 3 50
⅝ to ¼ by ¼ and 5-16 do 3 10

Half Oval and Half Round.

Wagon box iron ¼ and ⅜.. 4 80
1-10c per lb extra will be charged for cutting to specified lengths

Light Band.

1⅛ to 6 by ¼ to 3-16..... 3 50

Hoops.

1¼ to 2 , Nos 16 to 18..... 3 90
1¼ to 4 do 13 to 15..... 3 60
1-10 extra for each gauge lighter

Sheet Iron.

No 22 to 24..... 5 60
No 25 to 26..... 5 85
No 27..... 6 10
No 28..... 6 60

English Steel.

Best cast.....₱ lb 15½c
Extra cast..... 16⅜c
Round machinery, cast 10c
Swaged, cast 18c
Best double shear..... 15½c
Blister, 1st quality..... 13c
Refined tool steel..... 16½c
Spring calking..... 7¼@7½c
German steel, best..... 11c
2d quality..... 10c
3d quality..... 9c
Sheet cast steel, 1st quality..... 15½c
2d quality..... 14½c
3d quality..... 12½c

American Steel.

Best brands of refined cast steel..... 12c
Crucible machinery..... 8c
Open-hearth ditto..... 5c
Hammer cast steel..... 9½c
Spring cast steel..... 7½c
Bessemer and open-hearth spring..... 5½c
Ditto plow..... 5½c
Steel boiler plate..... 6½@7c
Bessemer machinery..5 @6c
Spring and calking.....7¼@7½c
Tire..... 5
Sleigh shoes..... 5

Bessemer Steel Tire.

⅝ to 1 by 3-32..... 4½ ₱ lb
⅝ to 1 by ½ to 5-32..... 4½ ₱ lb
⅝ to 1 by 3-16 to ⅝..... 4½ ₱ lb

Miscellaneous Cast Steel.

Auger and auger bit..... 8
Axle steel for wagons..... 8
Frog points and plates..... 9
Frog size bars..... 7½
Pick, plain..... 10
Mattock, beveled..... 9
Table cutlery..... 8½
Trap spring steel..... 9
Pike and cant hook..... 8½
Coal and granite..... 8½

TINNER'S STOCK.

Tin.

Banca, large pig..per lb. 33c
Straits..... " 25½
English..... " 25c
Bar..... " 27c

Tin Plate.

IC 12x24 charcoal..... $ 7 00
IC 14x14 do..... 11 00
IX 14x14 do..... 14 00
IXX 14x14 do..... 17 00
DC 12½x17 do..... 6 75
DX 12½x17 do..... 8 75
DXX, 12½x17 do..... 10 75
DXXX, 12½x17 do..... 12 75
IC, 20x28 do..... 14 50
IX, 20x28 do..... 18 50
IXX, 20x28 do..... 22 50
IC, 14x20, Best Roof..... 6 25
IX, 14x20, do..... 8 25
IC, 20x28 do..... 13 00
IX, 20x28 do..... 17 00
IC, 10x14 Best Coke..... 6 00
IC, 10x20 do..... 9 75

Solder.

Half and Half, in bars.....17
No. 1 do.....15
Spelter Solder.....25

Pat Planished Sheet Iron.

[A].....per lb 10½c
[B]..... 9½c

Nos	10	15	21	25
to	14	20	24 & 26	
Com	3-60	3-80	4-00	4-20
Char	5-60	5-60	6-00	6-20

Sheets over 28 in. wide ¼c extra

Zinc.

Sheet, cask..... 7¼@ 7¾
Sheet, open..... 8@ 8¼

Tinners' Tools & Machines.

Machines (P. S. & W.) list add 20
Tools (P. S. & W.).....add 5

Gas and Steam Fitters' and Machinists' Supplies.

Gas and Steam Pipe.....dis 60.
Enameled Pipe.....dis 65
Artesian Well Casing....net list
Hydraulic Tubes.....net list
Malleable Iron Fittings..net list
Cast Iron Fittings.....dis. 35
Globe Valves.....dis. 35
Angle Valves.....dis. 35
Check Valves.....dis. 45
Safety Valves.....dis. 35
Eddy Gate Valves.....dis. 20
Steam Cocks.....dis. 35
Service Cocks.....dis. 35
Ball Gauge Cocks (net per dozen).....$15
Compression Gauge Cocks dis. 35
Miss. Gauge Cocks.....dis. 35
Register Gauge Cocks (net per dozen).....$15
Cylinder Cocks.....dis. 30
Air Cocks (net per dozen)..$2 75
Oil Cups.....dis. 30
Steam Gauges.....dis. 30
Water Gauges.....dis. 45
Scotch Glass Tubes.....dis. 60
Steam Whistles.....dis. 35
Iron Body Globe Valves..dis. 35
Iron Body Safety Valves..dis. 35
Iron Body Steam Cocks..dis. 35
Pipe Tools.....special
Globe, Angle and Check Valves (Star's regrinding).....dis. 25
Mack's Injectors.....dis. 25

Babbitt Metal.

No. 1.....₱ lb 16
" 2..... " 14
" 3..... " 10
" 4..... " 8

LEAD.

American, ₱ lb.....5½@5¾c
Bar, ₱ lb.....6¾c net
Pipe, ₱ lb 7¼c dis 10 per ct
Sheet, ₱ lb. 8c dis 10 per ct
Tin-lined pipe ₱ lb 15c dis 10 per ct
Shot Drop 7c; Buck.....8c
Chilled Shot.....8c

COPPER.

Lake Ingot.....18¼@18¾c
Baltimore.....17⅝@17¾c
Arizona.....18c
Sheathing Braziers Copper, Bolts, &c.
Brazier's Copper, ordinary sizes, 16 oz. per sq. foot, and over per lb.....30c
Brazier's Copper, ordinary sizes, under 16 oz. and over 12 oz. per sq foot, per lb 32c
Brazier's Copper, 10 oz and 12 oz. per sq ft. per lb. 34c
Brazier's Copper lighter than 10 oz. per sq ft. per lb. 36c
Circles less than 84 inches in diameter. per lb. 33c
Circles 84 inches in diameter and over.....per lb. 30c
Segment and Pattern sheets per lb. 33c
Locomotive Fire Box sheets per lb. 30c
Sheathing Copper, over 12 oz. per sq. ft.....per lb. 28c
Bolt Copper.....per lb. 30c
Copper Bottoms. per lb. 31@32c
No copper is Sheathing except 14x10 inches, and not to exceed 34 oz. to the sq. ft.

Tinning.

14x18.....per sheet 6c
All other size sheets, 2½c per square foot. For tinning both sides, double the above amount.

SCRAP IRON AND OLD METAL

DEALER'S SELLING PRICES.

	Net Tons.
No. 1 wrought scrap	$24
Sheet and hoop "	10@11
Cast scrap, (No. 1 heavy)	19
Cast Scrap (Stove Plate)	12

OLD METALS.

Old copper per lb	15
No. 1 H. Brass per ₱	14
Heavy yellow Brass do	12
Light Brass per ₱	12
Scrap Zinc per ₱	6
Tea Lead per ₱	3
Heavy Lead per ₱	4

PIPE, WROUGHT.

Standard Wrought Iron Lap Welded Steam and Gas Pipe.

Inside Diameter. Inches.	Plain, Price Per Foot.	Galvan. or Enameled Per Foot.	Outside Diameter Inches.	Weight Per Foot.
⅛	08		.40	.24
¼	08	$0 11	.54	.42
⅜	09	12	.67	.56
½	11	15	.84	.85
¾	13½	19	1.05	1.13
1	19	28	1.31	1.67
1¼	27	40	1.66	2.26
1½	33	47	1.90	2.69
2	46	64	2.37	3.66
2¼	75	1 00	2.87	5.77
3	95	1 30	3.50	7.55
3½	1 25	1 70	4 00	9 05
4	1 50	2 05	4 50	10.73
4½	1 75	2 40	5.00	12.49
5	2 25	3 00	5.56	14.56
6	2 75	4 00	6.62	18.76
7	3 75	....	7.62	23.00
8	4 75	....	8.62	28.00
9	6 50	....	9 68	34.40
10	8 00	....	10 75	40.64
12	12 00	....		54.65

Discount, 62½ per cent; galvanized, 62½ per cent.

BRASS.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c per lb.

High Brass.

All Nos not thinner than No. 28, wider than 2 in. not wider than 14 inch.....30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in. inclusive.....35c
All Nos. to No 28, inclusive, and widths over 20 to 30 in. inclusive.....38c
½c per lb. advance on each No above Nos. 28 to 38, inclusive.
All Brass thinner than No. 8 is Platers' Brass at.....53c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 inches, in width wider than 2 inches .37c

Low Brass.

4c per lb. more than High Brass.
Gilding metal 8c per lb. more than High Brass.
Platers' or Gold Metal
In Bars.....48c
Sawed.....51c
Planed or Polished...54c

For Slitting.

Metal in width in. to ½ in. to No. 28, inclusive, 1c per lb advance.
Metal, in width 2 in. to 1 in., thinner than No. 28, 2c per lb. advance.
Metal, in width ½ in. to ¼ in. thinner than No. 28, 5c per lb. advance.
Metal ¼ in. in width and less, 10c per lb. advance.
Any of the above widths cut to particular lengths, add 7c per pound.

COAL,

WHOLESALE.

Wholesale f.o.b. vessel at Cleveland:

Carbon Hill and Monday Creek	$2 65
Massillon	2 75@ 2 85
Brier Hill	3 25@3 75
Pittsburgh	3 00
Salineville	2 25
Tuscarawas	2 25

RETAIL.—Delivered.

Massillon Lump	$4 00
" Nut	3 75
Carbon Hill and Monday Creek, lump	3 75
Carbon Hill and Monday Creek, nut	3 50

75c less on cars by car load.

Anthracite Stove and Chestnut	7 15
Egg and grate	6 00

GLASS.

(Per box of 50 feet)

SINGLE THICKNESS

6x8 to 10x15	7 50
11x14 to 15x24	8 50
16x24 to 20x28	9 75
15x34 to 24x30	10 75
26x28 to 24x36	11 50
26x36 to 26x44	13
26x46 to 30x50	14 00

DOUBLE THICKNESS

6x8 to 10x15	11 7
11x14 to 15x24	13 25
16x24 to 20x28	15 75
15x34 to 24x30	17 25
26x28 to 24x36	18 50
26x36 to 26x44	21 25
30x50	22 50
30x52 to 30x54	23 25
30x56 to 34x56	25 00
34x58 to 34x60	27 75
36x60 to 40x60	30 00

Dis 60 & 15 single, 60 & 20 double

OILS.

Pure Oils. packages included

Sperm, winter bleached per gal	1 25
Whale, winter bleached per gal	63
Straits	50 @ 53
"A" oil for tanner's use	35 @ 40
Lard oil extra W S	1 03
do No 1 do	85
do No 2 do	70
Tallow oil	70@75
Neatsfoot oil pure	85
do No 1	80
Linseed oil, raw	57@59
do do boiled	60@62
Cotton seed oil white	64 @ 66
do do yellow	60 @ 63
West Virginia lubricating 28 deg	13c@15c
Pure Mecca	55@ 50
Paraffine oil winter pressed	25@ 30
Machinery	40
Engine	50
Miners' oil	40@45
Drilling oil	40

Hides and Leather.

Prime cured hides	7¾
Green hides	6@6¼
Bull, scrubby, badly scored or damaged, cured, two-thirds price.	
Prime dry hides	13@14
Horse hides, green	$1 75@2 00
Horse hides, dry	$2 00@2 25
Prime cured veal calf	12½
Prime Deacon Skins, salted	65@75
Pelts, wool on	32@34
Fresh slaughter sheep	30@$1 50
Fresh slaughter lambs	50@60
Green calf skins	13
Hemlock rough	23@24
Oak harness	34@33
Oak sole	37@48
Union harness	31@40

Cleveland Business Directory.

Assayers and Analytical Chemists.

JUDSON, W, E, Ana ytical Chemist, 8 Cushing Block.

Bolt and Nut Works.

HOTCHKISS & GAYLORD, manuf'rs. Machine, Plow & Elevator Bolts, Coach Screws.

Boiler Makers.

SMITH & TEACHOUT—(Established 1857.) Boiler, Tanks, Stills etc. 439 Broadway.

Bridge Builders.

BUCKEYE BRIDGE AND BOILER WORKS mfrs of Arch & Truss Bridges, Boiler Tanks and Oil Stills. Bet. Wasson St. and Case Ave.

Coal and Iron Exchange.

JACKSON IRON CO. Iron Ore and Pig Iron. Rooms 8 and 9. Fayette Brown, Gen. Agent.

RHODES & CO. Coal, Iron Ore an Pig Iron. Rooms 1 and 2.

Carriage Blacksmith.

STRIEBEL, CHAS. manfac'r. of Carriages and Wagons and platform trucks. Horse shoeing and general blacksmithing .96 Woodland ave.

Carriage Bolts.

THE COLWELL & COLLINS NORWAY BOLT CO., manufacturers of Philadelphia Carriage and Tire Bolts.

Church and School Furniture.

FAULHABER, GEO. manufacturer of School and Church Furniture. Fine Hard Wood work a specialty. 208 Ontario Street.

Custom Boots and Shoes.

ROONEY, JOHN manufacturer of hand-made Boots & Shoes, custom made and warranted 177 Ontario Street.

Carriage Repository.

GREENE'S, J. O., Carriage Repository, 408 Superior street and 52, 54 & 56 Rockwell street, dealer in Fine Carriages. Repair shop in connection.

SLATER, G. A., Carriage dealer, sells the best work for the lowest price. A fine assortment always on hand. Repository 365 Euclid Avenue.

Coal and Pig Iron.

ANDREWS, HITCHCOCK & CO., Briar Hill Coal and Pig Iron. 122 Water Street.

Electrical,

ELECTRIC SUPPLY CO. manfrs and dealers in Electric Burglar Alarms, Annunciators, Cell Bells and Batteries. Telephone lines built and repaired. 145 Seneca Street.

Fresco Artists.

KEMMER & KUSHMAN DECORATIVE CO., Fresco Artists, Fine Modern Wall Papers. 332 Euclid ave.

Foundries.

BOWLER & CO., Car Wheels, Patent Chilled Frogs, and all kinds of castings. 9 Winter.

CLEVELAND MALLEABLE IRON CO., manufacturers Malleable Iron Castins.

LAKE SHORE FOUNDRY, Water and Gas Pipe, Light and Heavy Castings. Alabama st.

TAYLOR & BOGGIS, successors to H. & H. F. Taylor, Iron Founders, 65 to 73 Central Way.

VIADUCT FOUNDRY COM'Y, Aenis, Carlin & Strangward manfrs of Machinery Castings Fine Light Castings a Specialty. Office & Works 11 13 15 and 17 Detroit Strert, near Center.

FITZSIMONS WM. & SON, Rolling Mill and Machinery castings. Rolls a Specialty. No. 435 Broadway.

File and Saw Works.

PARKIN, W. H. & CO., Hand-cut Files and Rasps, dealers in Disston's saws, 11 So. Water

Flue Cleaner.

CLEVELAND FLUE CLEANER M'F'G. CO. manufacturer of Aitchison & Doolittle's Patent Steam Flue Cleaner, 22 & 24 Power Block.

Hotels.

FOREST CITY HOUSE, cor. Public Square and Superior st., Terrill & Ingersoll, Props.

KENNARD HOUSE, D. McClasky, Prop.

NEW ENGLAND HOTEL. Water st., W. W. Wolcott, Prop. Refitted and refurnished.

STRIEBINGER HOUSE, between Ontario and Seneca sts. $2.00 per day. Hawley & Langton

CITY HOTEL, Seneca street. H. B. West, proprietor. $1.50 per day.

Hides, Pelts and Leather.

DENNISON BROS., dealers in Hides, Pelts, Furs and Tallow. 48 and 50 River street.

Hardwood Lumber.

MARTIN, J. T. dealer in Hardwood Lumber, Stone's Levee, near Central Way.

Lumber.

WOODS, PERRY & CO., manufacturers and dealers in Lumber, Lath, etc., 5 Carter st.

FISHER, WILSON & CO., wholesale lumber dealers (pine & hard wood), rough and dressed umber, timber, lath, shingles, etc. 47 Central Way

KRAUSE, C. A., & SON, wholesale and retail dealers in lumber. Yards cor. Superior and Wason and 281 Merwin streets.

Cleveland Business Directory.

Hardware and Iron.

BINGHAM, WM. & CO., Hardware, Iron, Nails and Metals, 148 and 150 Water street.

CLEVELAND ROLLING MILL CO., manuf'rs. of Steel and Iron Wire and Steel Tire.

WORTHINGTON, GEO. & CO., Hardware and Dealers in Metals, Water street.

Lime Manufacturers.

RUSSELL LIME CO., manufacturers of White Lime; also dealers in Plaster, Cement, etc. 85 Elm street.

Machinery and Boilers.

CLEVELAND STEAM FURNACE CO., Engines and Boilers, cor. Detroit and Center sts.

KRITCH, K. E. Metal Pattern Maker. Small machinery repaired. Lawn Mower sharpening a specialty. 42 South Water Street.

Machinery Depot.

CLEVELAND MACHINERY DEPOT, (now National Machinery Depot.) The largest stock of New and Second-hand Engines, Boilers and Machinists' Tools. Shop and Warehouse corner Bond and Superior streets.

Mercantile Agency.

THE MERCANTILE AGENCY. R. G. Dun & Co. proprietors. 121 Superior street.

Oil Manufacturers.

AMERICAN LUBRICATING OIL CO., manufacturers of lubricating oils, 23 Euclid ave.

Paints and Oils.

MASTERS, J. N. jobber in Paints, Oils, Varnishes. Brushes, 34 Prospect st.

Pattern and Model Makers.

WHITTINGHAM, J. & C., Metal Pattern and Model makers. 52 Canal Street.

STAIR BUILDER.

PFEIL, CHAS, Stair Builder; Hard Wood Mantles and Office Railing. Works, 49 & 51 Canal street, Cleveland, Ohio.

JOHNSON & PURSER, Stair Builders, and manuf'rs of Mantels, Odd Pieces of Furniture, &c. 30 West street, up stairs.

Steel Stamps and Stencils.

FLEHARTY, J. H. & CO., Rubber Stamps, Seals, Stencils. 197 Superior street.

Tanners.

GAENSSLEN BROS., Tanners, and dealers in leather, oil and shoe findings. 80 Water-st.

Trunks and Valices.

FABER, J. manuf. Trunk, Traveling Bags and Ladies' Fine Satchels. Sample Trunks and Cases a Specialty. 56 Public Square.

Vessel Agents.

WEBB, H. J. & CO., Ship Brokers and Vessel agents. 17 & 18 Board of Trade Building. 122 Water Street.

Wood Carving.

HERKOMMER, J., Carver and Ornamenter in Composition. 225 Erie street.

Business Directory.

Akron, O.

AKRON IRON CO., manufacture best Common, Refined and Charcoal Iron.

CASCADE HOUSE, cor. Mill and Summit sts., near Depot. J. Downie, Prop.

MCNEIL, J. C., Steam Boilers, Heavy Sheet Iron Work. Repairing promptly executed.

PERKINS, C. E., dealer in Agricultural Implements, machinery, and Manufacturers' Ag'nt

TAPLIN, RICE & CO., manuf'rs. of Stoves and Hollow Ware, dealers in Tinners' Stock, etc.

WEBSTER, CAMP & LANE MACHINE CO., Founders and Machinists, 12 Main street.

Alliance, O.

ARLINGTON HOUSE, cor. Main and Liberty Streets. Centrally located. Sample Room for Commercial Travellers. H. S. Adams, proprietor

MCFARLAND, J. W. Engine and Machine Builder, and General Machine Jobbing

Cuyahoga Falls, O.

THOMAS BROTHERS, manfrs of Ohio Stone Ware. Cuyahoga Falls Stone Ware Factory, cor. Main and Broad streets,

TURNER, VAUGHN & TAYLOR, manufacture engines, presses and grinding machinery for clay; also paper, chain, wire and flour mill machinery. Send for Circulars and price list.

SNYDER, H. wholesale manufacturer of Sash, Doors, Blinds, &c. Send for Price Lists.

THE CUYAHOGA FORGE AND IRON CO., manfrs. of every description Car, Truck and Driving Axles, Forging, Shafting, &c.

Canal Dover, O.

HECKMAN, E., manufr. and dealer in harness leather, upper, kipp and calf. Also, manufacturer & dealer in prime English Dairy cheese. Highest market cash price paid for hides.

Business Directory.

Columbus, O.

PAT. ADJUSTABLE WINDOW CURTAIN Cornice, manufactured by Strader's Curtain Cornice Works.

ROYCE & PULLING manufrs of Patent Steam Pumps for all purposes. Store room 30 High street. Works Nos. 5 and 7 Scioto street.

U. S. CARRIAGE CO. builders of fine Carriages, Buggies and Phætons. Salesrooms and Office 257, 259 and 261 Fourth street.

REYNOLDS BROS., manufacturers of hand-cut Files and Rasps. Old files re-cut. Send for Price List.

CITY BOILER WORKS, manfrs of Stationary, Portable and Locomotive Steam Boilers. All work warranted. Borger Bros. & Co.

MURRAY, HAYDEN & CO., manfrs of Malleable Iron. Cor. Randolph & West streets.

Canton, O.

DIEBOLD SAFE & LOCK CO., manuf'rs. Safes, Locks, Bank and Safe Deposit Works.

NOVELTY IRON WORKS, Mill work, Shafting, engines, Imperial job printing press, etc

NEW AMERICAN HOUSE, Canton. Fred. Hipp, Prop.

EBERSOLE & KAILEY, Machine and Jobbing Shops. Gearing for Patterns or Machinery a specialty. Models of all kinds made & repaired.

Geneva, O.

THE ENTERPRISE MACHINE CO., L. L. Crane, Pres't, manfrs of Machinists' Tools and Machinery. Gear Cutting a specialty.

Lima, O.

LIMA HOUSE, centrally located; telegraph office in the house. J. Goldsmith, Prop.

Massillon, O.

CITY CARRIAGE WORKS, P. H. Young, prop. manfact'r of Carriages, Phætons and Spring Wagons. Work warranted. Cor. Tremont & Erie.

Painesville, O.

NORTH AMERICAN CUTLERY CO., m'fr's of Steel Shears and Scissors—best quality.

Ravenna, O.

THOMPSON, T. F., dealer in Agricultural Implements, farm machinery, hardware, seeds, fertilizers, &c. Cor. Main and Prospect sts.

BALDWIN, D. L. & SON, Contractors & Builders and manfrs of all kinds of Moulding, flooring, siding, &c. Rip, Band and Scroll Sawing.

Steubenville, O.

DORRANCE, D. W., Tool Works, manufacturer of hand-made miners' and stone-cutters' Tools Promp attention given to mail orders.

Sandusky, O.

SANDUSKY WHEEL CO. manfrs. of Sarven Patent Wheels, Carriage Bodies and Seats, Plain Wood Hub Wheels, Banded Hub Wheels, Jacobs' Patent Neck Yokes.

Toledo, O.

BAKER, HERBERT, Machine Shop and Iron Foundry. 98 and 100 Erie street.

TOLEDO FOUNDRY AND MACHINE CO. builders of Steam Engines, Circular Saw Mills and all kinds machinery. Water St., cor. Cherry

RUSSELL IRON WORKS, manfrs. of Architectural Iron Work, castings, pulleys, shafting and steam bending machinery. Cor. Water and Lagrange streets.

STANDARD SAW WORKS, H. Bartley, manufacturer and dealer in Saws of every description. All kinds of Springs made from Sheet Steel. Reaper, Hay Knives Truss Springs, &c. made to order. 92 St. Clair Street.

UNION Wooden Ware Manufacturing Co. manufacture Sewing machines, washboards, children's wagons, carts, wheelbarrows, sleds, kitchen wooden ware, &c.

HEPBURN BROTHERS, proprie. Union Boat Works. Boats of all kinds made to order. For sale or rent. Water Street foot of Cherry.

Youngstown, O.

BELL, EDWIN & SON, manuf. of Nail Kegs, Pat. coiled hoops, slack barrel and keg heading and oil barrel stock.

DINGLEDY, G. H. dealer in rough and dressed Lumber, Shingles and Lath.

MORTON HOUSE, formerly Maitland House, James Morton, Prop.

TOD HOUSE, cor. Diamond and Market streets, Henkel & Bowman, Props.

Zanesville, O.

KIRK HOUSE, William Kirk, proprietor. $1.50 per day.

Rochester, Pa,

OLIVE STOVE WORKS, (limited) manufacturers of Stoves and Hollow Ware.

Erie, Pa.

ERIE STEAM BENDING WORKS. H. G. Fink, prop'r, manufacturer of Bent Felloes, poles, snafts, bob runners, etc. Cor. 12th & Cherry.

GUNNISON, A. B., wholesale manufacturer of Wood Pumps. 233 East Twenty-Second St.

BALL ENGINE CO., limited, manufacturers of Automatic Engines of 15 to 80 horse power

NOBLE SEWING MACHINE CO. manfrs of the New Noble Sewing Machine. Send for circulars and prices.

A. B. FELGEMAKER & CO. Church Organ builders. Descriptive catalogue furnished on application.

Business Directory.

Titusville, Pa.

FOSTER & MCKAY, dealers in boilers and engines, tubing, casing, old iron, rope, and all kinds of metals. Washington street, nr. Railroad.

Meadville, Pa.

CURRY & CO. general jobbers in Castings of all kinds.

Oil City, Pa.

REID, JOS. Machinist, steam engine and pump repairing. Brass and iron castings, light and heavy, made on short notice.

Sandy Lake, Pa.

EBERMANN, W. S. & SONS, manfrs. of the celebrated Ebermann Boiler Feeder. Send for Circulars and Price List.

Pittsburgh, Pa.

PRINTING PRESSES. W. A. Bunting, manufacturers' agent. Printers supplies, type, cards. 42¼ Sixth Street. [Up stairs.]

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Wheeling, W. Va.

EXCELSIOR MACHINE WORKS, Redman & Co., general machinists and manufacturers of Marine and Stationary Engines, Hangers, Pulleys, Shafting, &c. Cor. 18th & Chapline streets.

Louisville, Ky,

HAIGHT, ROBERT, Gold, Silver and Nickel Plating and Brass Finishing Shop. Car Trimmings and Steamboat work a specialty. 1 West Market street.

Union City, Ind.

LAMBERT, J. W. & CO., mfrs of fork, rake, hoe and broom handles; spokes, hubs, whiffletrees, yokes, plow-rounds, &c. Correspondence solicited.

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MYRICK BROS. & CO., manufact'rs Engines and Boilers, oil drilling tools, rig irons, etc.

Rochester, N. Y.

GOWE, JNO. N., mfrs. of Specialties, such as Machine forging, bridge bolts and trusses, railroad switches, spike, mall, chisels, &c.

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WOOD-WORKING MACHINERY. Send for Catalogue. J. S. GRAHAM & CO.

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WISEMAN, Albine, manufacturer of all kinds of Shoemakers' Tools. 117 North Water St.

ULSCHT & LINN mfrs of Wood Lathes, Engraving Machinery, &c 131 N. Water street

RAZOR STROPS. Sole mfrs. of all kinds of Razor Strops. Ulscht, Linn & Co. 131 N. Water

Buffalo, N. Y.

SANDS, PAUL, Marine and Stationary Steam Engine Works mfr. of drilling machines, foot and power lathes. 70 Columbia street.

EMPIRE STATE MF'G CO., O. F. Swift, prop'r, manfr of Fluters, Sad Irons, Spun Copper & Half Copper Tea Kettles. Washington, cor. Ohio

WHITE, L. & I. J. manfrs of Coopers' Tools, Carpenters Tools, Draw Shaves, Cleavers Choppers, Ship Tools, &c. 312 Exchange street.

THE BUFFALO NUT AND BOLT CO. [Limited.] Manufrs. of Hot Pressed Nuts, Bolts, Washers, Rivets, &c. No. 226 Ohio Street.

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GREAT WESTERN CHAMPAGNE. Finest made in America. Equal to best imported. Has taken highest awards everywhere, and is used all over the Continent. Try a case, and you will have no other. Pleasant Valley Wine Co., Rheims, N. Y.

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J. ESTEY & CO.,

Brattleboro', Vt.

(Catalogue free on application.)

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Engraver on Wood
Cor. Circle & Market Sts.
JOURNAL BUILDING INDIANAPOLIS, IND.

CLEVELAND
ELECTROTYPE
FOUNDRY
55 FRANKFORT STREET 55
CLEVELAND, O.

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The National Machinery Comp'y

Corner Superior, Bond and Rockwell Streets, Cleveland, O.,

On account of want of room and facilities to overtake their orders, are

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RAILROAD FACILITIES, COAL, ETC., for the REMOVAL OF THEIR WORKS. Employing over ONE HUNDRED mechanics, with a $5,000 monthly Pay Roll, they could guarantee, with larger accommodations and as soon as men could be had, to run about Two Hundred Hands, and in the future to increase this number. They propose having

THE BEST TOOL SHOP IN THE WEST,

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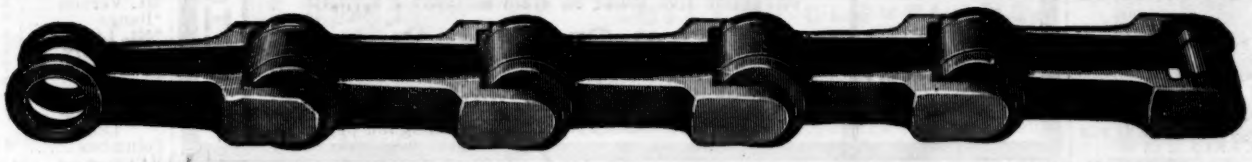
Being the only Specialists in the United States in their Line they are comparatively independent of location for business.

ADDRESS, The National Machinery Company,
Office and Wareroom, Superior, Bond and Rockwell Streets, Cleveland, Ohio.



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CHAIN BELTING FOR TRANSMITTING POWER. The only medium made that will transmit so nearly ALL the power applied. No slipping nor lost motion. Especially adapted for driving HEAVY SHAFTING, ROLLER TRAINS in ROLLER and RAIL MILLS, TRACTION ENGINES, AGRICULTURAL MACHINERY, ELEVATORS, DRAGS, HOISTS, DREDGING MACHINES, LIFTING CRANES, ELEVATING NUT, SLACK and PEA COAL, SAWDUST and TAN BARK CARRIERS, &c., &c., &c., manufactured and sold by the **LECHNER MANUFACTURING CO., Columbus, O.** Also manufacturers of the LECHNER COAL MINING MACHINES, and power ROTARY COAL DRILLS. For further information send for Circulars.

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Gold, Silver & Nickel Platers

109 Ontario Street.
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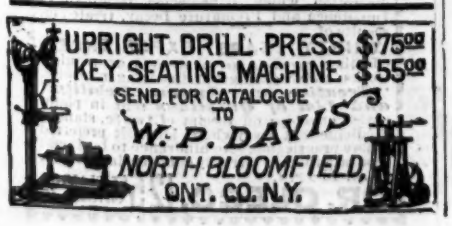
JUDSON'S PATENTED
SECTIONAL
Assay Furnaces
AND APPLIANCES.
Model Furnace for 1881,
All steel, light and durable, with Revolving Grate, etc. Also
Judson's Practical Stoking Attachment
Guaranteed to feed coal, coke or charcoal without choking the draft.
Manufactured only by the patentee,
W. E. JUDSON,
Cleveland, O



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Manufacturers of

Power and Foot Presses,

Dies and Tools
FOR WORKING
Sheet Metal and Wire.

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And Tinners' Tools, &c.

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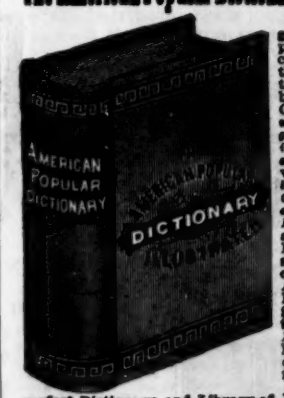
BUFFALO, N. Y.

The American Popular Dictionary. $1. Only.



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TRAVELERS' REGISTER.

Lake Shore & Michigan Southern.

Trains marked with a * are the only trains that arrive and depart in this city on Sundays.

EAST BOUND TRAINS.

	Arrive.	Depart.
No. 20 Limited Express	*1:35 A.M	*1.50 A.M
No. 6 Atlantic Express	*7:05	*7.30
No. 10 Buffalo Accom.	11:00	11.15
No. 8 C. & St. L. Exp.	*2:25 P.M	*2.55 P.M
No. 4 Special N. Y. Exp	10:10	10.35
No. 2 San. Div. Accom.	10:12	
No. 12 Conneaut Accom.		4.50
Nottigham Accommodation (Sundays only)	10.05 A.M / 4.45 P.M	9.00 A.M / 2.15 P.M
No. 18 Elyria Accom.	8.50 A.M	

WEST BOUND TRAINS.

	Arrive.	Depart.
No. 13 Mich. Accom.		6.40 A.M
No. 1 Special Chicago Ex.	*6 35 A.M	7.00
No. 3 Toledo Express	1.25 P.M	3.30 P.M
No. 21 St. Louis Express	*1.40	*2.05
No. 5 Pacific Express	*7.05	*7.35
No. 11 Conneaut Accom.	8.40 A.M	
No. 19 Pt. Clinton Accom.		5.00
No. 7 Michigan Exp.	*2.50 A.M	*3.05 A.M
No. 17 N.Y. & Chi. Ex.	12.23 P.M	12.33 P.M

Cleveland, Columbus, Cincinnati & Indianapolis.

ARRIVALS.

No. 2 Col. & Cin. & Ind'pous Ex.	*7 10 A.M
No. 8 C. T.V. & W. & Clev Accom.	10 30
No. 12 St. Louis & New York Exp.	*3 00 P.M
No. 4 Special Cin. & New York Exp.	*3 40
No. 10 Wheeling & Cleveland Exp.	7 15
No. 6 Indianapolis & Columbus Exp.	10 20

DEPARTURES.

No. 1 Cincinnati & Columbus Exp.	8 00 A.M
No. 11 Cleve, Indianap. & Wheel'g Ex.	7 10
No. 3 St. Louis & Cincinnati Ex.	†2 00 P.M
No. 5 Night Express,	*7 25
No. 7 C.T.V. & W. & Col. Accom	4 00

†This train runs daily to Indianapolis and St. Louis, and daily, except Sunday, to Cincinnati.

Cleveland, Tuscarawas Valley & Wheeling.

ARRIVALS.

No. 4 Wheeling & Cleve'd Exp.	7 15 P.M
No. 2 Uhrichsville Accom.	10 30 A.M

DEPARTURES,

No. 1 Wheeling & Cleve'd Exp.	7 10 A.M
No. 3 Uhrichsville Accom.	4 00 P.M

New York, Pennsylvania & Ohio.

ARRIVALS.

No. 7 Mahoning Valley Accommo.	10 55 A.M
No. 3 New York Express,	*7 00 P.M
No. 1 New York Express,	6 50 A.M
No. 3 Pittsburgh Express,	*7 00 P.M
No. 5 Pittsburgh Express,	2 00
New York Express	2 00
No. 9 Youngstown and Pitts. Local	10 15

DEPARTURES.

No. 12 New York Express,	*7 10 A.M
No. 4 Youngstown Local,	11 00
No. 8 Mahoning Accommodation,	4 25 P.M
No. 2 New York Express,	10 45
No. 12 Pittsburgh Express,	*7 10 A.M
No. 6 Pittsburgh & Main Line Express	2 30 P.M

Cleveland & Pittsburgh.

	ARRIVE.	DEPART
Mail	1 45 P.M	8 50 A.M
Express	6 55	2 30 P.M
Alliance Accommodation	10 15 A.M	3 45
Ravenna Accommodation	8 35	5 30
Night Express	6 30 A.M	†11 40 P.M

† Night Express runs daily, except Saturday, by way of Wellsville, and on Saturday by way of Alliance.

Valley Railway.

ARRIVE.	DEPARTURES.
No. 2 Accom. 10 15 A.M	No. 1 Mail 8 15 A.M
No. 6 Express 1 35 P.M	No. 3 Accom. 2 20 P.M
No. 4 Mail 6 30 P.M	No. 5 Exp. 6 05

Special trains leave on Sunday at 8.30 A. M. and 4.20 P. M., arriving at Cleveland at 10 A. M. and 6.25 P. M.

Trains leave from Depot foot of South Water Street.

Connotton Valley Railway.

Arrive.	Depart.
No. 1 10 05 A.M	No. 4 4 05 P.M
No. 3. 7 15 P.M	No. 2 0 15 A.M

All trains arrive and leave depot corner Commercial and Fifth Streets

Cleveland, Akron & Columbus Railroad.

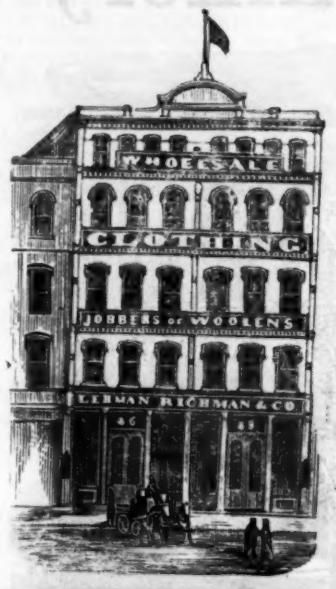
Cleveland, Akron & Columbus Railroad, running over Cleveland & Pittsburgh Railroad to Hudson, for Akron, Columbus, etc.

	ARRIVE.	DEPART.
Mail	1 15 P.M	8 00 A.M
Express	7 25	1 50 P.M
Accommodation	10 10 A.M	3 45 P.M

Lehman, Richman & Co.

IMPORTERS

AND JOBBERS OF



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And Manufacturers of

Men's, Youths', Boys' and Children's

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86 & 88 WATER STREET, CLEVELAND, O.

invite the attention of close and short time buyers to the LARGEST STOCK between New York and Chicago, at prices guaranteed AS LOW as made by ANY responsible house in the United States.

Greatest Rock Breaker

ON EARTH.

CAPACITY { A TON A MINUTE. Don't Forget It!

Guaranteed to do Double the Work of any other or Money Refunded.

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MOSER & THOMPSON,

MANUFACTURERS

Corrugated Iron Siding for Grain Elevators a Specialty.

Iron Ore Paints.

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CLEVELAND, OHIO.

Send for Circular and Price List, mentioning this paper.

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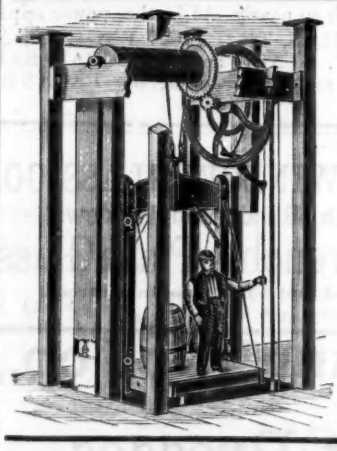

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BUILDERS EXCLUSIVELY OF

Elevators & Hoisting Machinery,

Hydraulic,

Steam and Hand Power, for Passenger and Freight.

Manufacturers' Agents for the

OTTO SILENT GAS ENGINE,

From 1 to 25 horse power.

ALSO THE RIDER HOT AIR PUMPING ENGINE,

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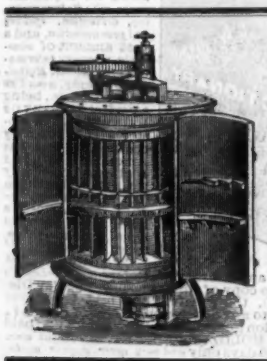
All kinds of Trucks made to order.

Factory, 175 West Larned-st.,—Office, 64 Griswold-st., DETROIT, MICH.



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Manufacturer of the

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BRAN DUSTER,

Mill street corner Brown

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Bran Duster Brushes and Wire Cloth furnished to order at Lowest Prices.

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WHOLESALE GROCERS,

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Wines, Liquors and Cigars,

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Truck Hubs.

Black Birch Carriage, Wagon and

TRUCK HUBS.

Sizes from 3½x6½ to 18x22.

R. M. WHITNEY,

OLEAN, Cattaragus Co., N. Y.

Cleveland Foundry.

CASTINGS

For Machinery and Rolling Mills.

Car Wheels

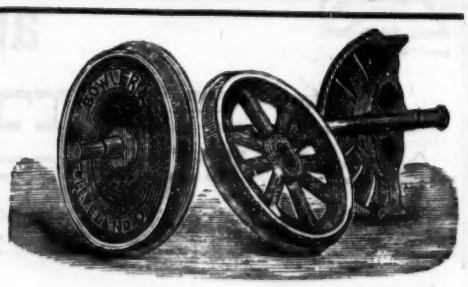
all sizes and kinds, with and without Axles.

Chilled Faced R. R. Frogs.

STREET RAILROAD TURNOUT

Nos. 9, 11, and 13 Winter Street.

BOWLER & CO.



Blue Grass Route of Ohio

TIME TABLE.

The Cleveland, Mt. Vernon and Delaware RAILROAD.

GEO. D. WALKER, RECEIVER.

Schedule No. 5--Dating from Sunday, June 4.

SOUTH-BOUND TRAINS.

STATIONS.	Accom	Accom	Expr	Mail	Sunday only
Leave.	P.M.	P.M.	P.M.	A.M.	P.M.
Cleveland	5.30	3.45	2.30	8.50	.....
Hudson	6.53	5.02	3.35	10.10	4 20
Cuyahoga Falls	7.11	5.30	3.53	10.29	4 40
Akron	7.23	5.46	4.10	10.42	5 00
*North Portage	P.M.	6.00	4 24	10.54*	6 14
Clinton	.....	6 19	4.44	11.09	5 31
Warwick	.....	6.29	4.49	11.14	5 37
*Marshallville	.....	6.43	5.02	11.27*	5 50
Orrville	.....	6 58	5.14	11.42	6 03
*Apple Creek	.....	7.17	5.32	11.58*	6 22
Fredricksburg	.....	7.32	5.45	12.11	6 37
*Holmesville	Accom	7.43	5.55	12.21*	6 46
Millersburg	A. M.	7.55	6.08	12.34	7 00
		P.M.			A.M.
Millersburg	5.50	.....	6.08	12.34	7 00
*Killbuck	6.02	.....	6.20	12.47*	7 13
*Black Creek	6.13	.....	6.31	12.59*	7 25
Gann	6.33 B / 6.53	.....	6.51 / 7.11 B	1.19	7 47
Danville	7.04	.....	7.20	1.29	7 59
Howard	7.13	.....	7.29	1.38	8 10
Gambier	7.22	.....	7.38	1.47	8 20
Mt. Vernon	7.35	.....	7.51	2.00	8 33
*Bangs	7.45	.....	8.01	2.11*	8 45
*Mt. Liberty	7.53	.....	8.09	2.20*	8 54
Centerburg	8.05	.....	8.18	2.30	9 05
*Condit	8.19	.....	8.32	2.44*	9 19
*Sunbury	8.27	.....	8.40	2.58*	9 28
*Galena	8.32	.....	8.45	2.58*	9 34
Westerville	8.48	.....	9.00	3 15	9 50
Arrive at Columbus	9.15	.....	9.25	3.40	10 20
	A.M.		P.M.	P.M.	A.M.

NORTH-BOUND TRAINS.

STATIONS.	Expr	Mail	Accom	Accom	Sundays only
Arrive at	P.M	P.M	A.M.	A.M.	A.M.
Cleveland	1.45	6 55	10.15	8.20	.....
Hudson	12.35	5.48	8.53	7.15	10.30
Cuyahoga Falls	12.16	5.30	8.33	6.58	10.11
Akron	12.03	5.17	8.20	6.45	9 50
*North Portage	11.46	5.00*	8.03	A.M.	9 34
Clinton	11.30	4.44	7.46	.....	9.18
Warwick	11.25	4.37	7.37	.....	9.12
*Marshallville	11.10	4.27*	7.23	.....	9.00
Orrville	10.57	4.14	7.10 B / 6.40	.....	8.47
*Apple Creek	10.40	3.56*	6.22	.....	8.27
Fredricksburg	10.26	3.43	6.08	.....	8.13
*Holmesville	10 16	3.33*	5.58	Accom	8.02
Millersburg	10.05	3.22	5.45	A.M.	7.50
				P.M.	P.M.
Millersburg	10 05	3.22	.....	8 35	7.25
*Killbuck	9.51	3.08*	.....	8.23	7.13
*Black Creek	9.39	2.57*	.....	8.11	7 00
Gann	9.17	2.36	.....	7.49	6 38
Danville	9.07	2.27	.....	7.39	6.25
Howard	8.58	2.18	.....	7.29	6 14
Gambier	8.49	2.09	.....	7.14	6 03
Mt. Vernon	8.37	1.57	.....	7.02	5.51
*Bangs	8.22	1.40*	.....	6.46*	5.37
*Mt. Liberty	8.14	1.31*	.....	6.37	5.28
Centerburg	8.05	1.22	.....	6.28	5.17
*Condit	7.51	1.09*	.....	6.14	5.03
*Sunbury	7.42	1.01*	.....	6.06	4 53
*Galena	7.37	12 56*	.....	6.00	4.47
Westerville	7.20	12.40	.....	5.43	4 30
Leave Columbus	6.55	12.15	.....	5.15	4.00
	A. M.	P M		P. M.	P.M.

* Stop on signal. B Breakfast. S Supper.

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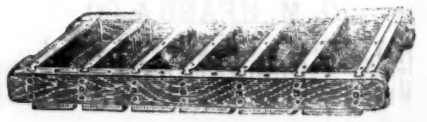

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7:10A.M. LIGHTNING EXPRESS, (daily,) sleeping and hotel coaches from Leavittsburg. 8:55 a.m. To New York, Albany and Boston without change. Parlor car, Cleveland to Salamanca. Arrives at Meadville 11:20 a.m., (dinner); Franklin, 12:33 p.m.; Oil City, 1:00 p.m.; Corry, 1:00 p.m.; Jamestown, (Lake Chatauqua) 1:57 p.m.; Buffalo, 6:15 p.m.; Rochester, 8:30 p.m.; Hornellsville, 6:40 p.m., (supper); Corning, 8:25 p.m.; Elmira, 8:57 p.m.; Binghampton, 10:58 p.m.; Albany, 6:00 a.m.; Boston, 2:45 p.m.; arriving at New York, 6:50 a.m.

10:45 P.M. NIGHT EXPRESS, (daily ex cept Sunday), Sleeping Coach from Leavittsburg to New York without change. Arrives at Youngstown 1:45 a.m.; Meadville, 3:50 a.m.; Corry, 5:20 a.m.; Jamestown, 6:22 a.m.; Buffalo, 9:45 a.m.; Rochester, 1:10 p.m.; Hornellsville, 11:20 a.m.; Corning, 12:53 p.m.; Elmira, 1:21 p.m.; Binghampton, 2:50 p.m.; New York, 9:25 p.m.

2:30 P.M. PITTSBURGH EXPRESS,—daily, through without change. Parlor Car, Cleveland to Pittsburgh, arrives at Youngstown, 5:00 p.m.; Pittsburgh, 7:48 p.m.; Washington, 7:30 a.m.; Baltimore, 8:15 a.m.; via Sharon and Sharpsville to Meadville 7:40 p.m.; Corry, 9:10 p.m.; Lakewood, 9:50 p.m.; Jamestown, 10:00 p.m.; Salamanca, 11:10 p.m.

4:25 P.M. MAHONING ACCOMMODATION, stopping at all way stations. Arrives at Youngstown, 7:25 p.m; Sharon, 8:30 p.m; Sharpsville 8:40 p.m; connects at Leavittsburg with train No. 20 for Meadville and intermediate points, arrives at Meadville, 11:05 p.m. Pittsburgh, 10:48 p.m.

7:10 A.M. PITTSBURGH EXPRESS,—(daily) through without change. Arrives at Youngstown, 9:50 a.m.; Sharon, 10:55 a.m.; Sharpsville, 11:05 a.m.; Pittsburgh, 12:45 p.m. Returning, leave Pittsburgh, 4:48 a.m., 8:33 a.m., and 1:13 p.m. and 4:20 p.m.

11:00 A.M. YOUNGSTOWN & PITTSBURGH Accommodation, stopping at all Way Stations, arriving at Youngstown 1:50 p.m.; Pittsburgh, 6:10 p.m. Trains arrive at Cleveland, 6:50 a.m., 10:55 a.m. 2:00, p.m. 7:00 p.m., and 10:15 p.m.

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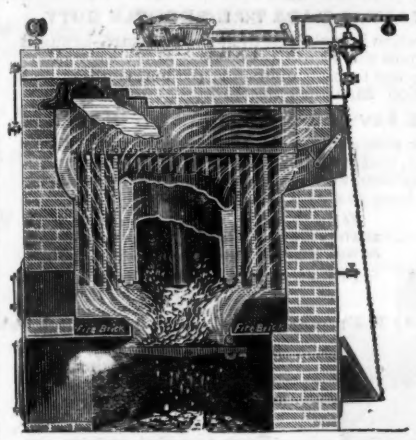

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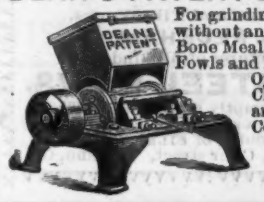

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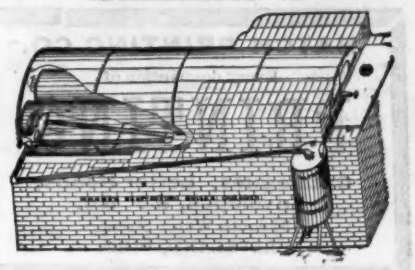

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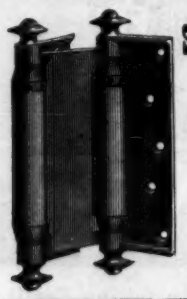
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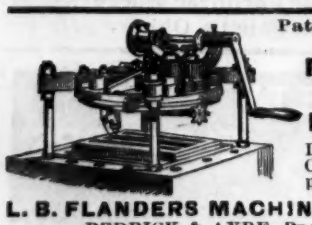
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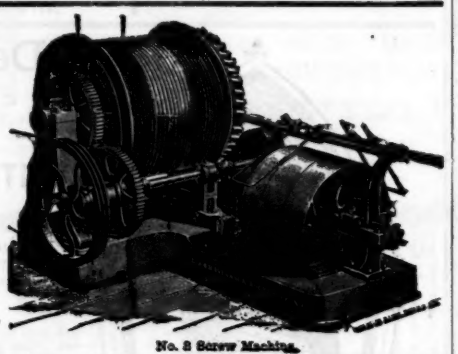
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